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ABSTRACT

A project sought to improve mathematics instruction at the Winnebago Public School (WPS) on the Winnebago Indian Reservation (Nebraska) and to provide purposeful interactions between preservice teachers from Wayne State College and Native American children. WPS educators, grades K-6, improved their mathematics instructional ability by attending in-service sessions presented by consultants in the field of Native American education, curriculum-based evaluation, and authentic assessment; comparing their teaching styles with the learning styles of the WPS students; and creating the WPS instructional mathematics manual for Caucasian teachers of Native American children. The manual is organized by grade (K-6). The activities presented are interactive, use manipulatives, and relate to Native culture. In accord with cultural values, contests and competitions are used sparingly. Each activity is accompanied by the relevant Nebraska standards and authentic assessment procedures. WPS students' mathematics scores showed a definite gain during the course of the project. Six appendices present the RIDD Strategy for strategic thinking, the Burger method of teaching word problem solving, references and resources, an in-service program on curriculum-based assessment, steps for teaching mathematics to Native Americans, and teaching word problem solving at the primary level. (TD)

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Project NAME

Native American Mathematics Education

Recommended Lesson Activities

With Authentic Assessments

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Wayne State College

Winnebago Public School

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ACKNOWLEDGMENTS

This manual is the final product of a year-long project in which Wayne State College students and faculty, the faculty and administration of Nebraska's Winnebago Public School concentrated on changing the methodology of mathematics instruction for Native American students in grades K-6.

We acknowledge the Eisenhower Professional Development Program grant awarded by the Nebraska Commission of High Education. Dr. Kathleen Fimple, Coordinator of the grant, gave us encouragement and positive feed-back.

The unique expertise of Dr. Hap Gilliland, author of *Teaching the Native American, 3rd ed.*, gave the project a valuable insight into the learning patterns of the Native American people. The WPS educators referred to his book and to the comments he made during his time on site.

Dr. Floyd Boschee, co-author of *Authentic Assessment: The Key to Unlocking Student Success*, conferred with individual educators of the WPS on authentic assessment. The procedures included in this manual are an outcome of his work with us. We look forward to further contact with him.

The 39 education majors at Wayne State College contributed to the project. They worked directly with the WPS educators and the Native American students. The professional demeanor they portrayed was exemplary.

Professional Participants in the Project

Dr. Paul Theobald, Dean of the School of Education and Counseling
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Mrs. Cheryl Burrell, Curriculum Director, Winnebago Public School
Dr. Daryl Wilcox, Grant Director, Wayne State College
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The K-6 faculty at the Winnebago Public School who participated in the project include: Michelle Anderson; Laura Botma; Donna Cain; Stacey Evans; Janean Georgesen; Rita Gomez; Gary Ham; Tiffanny Heese; Shannon Honold; Toni Huggenberger; Cynthia Jensen; Leanne Linton; Joanna Meehan; Jennifer Pippin; Tina Rickett; Lori Tremayne; and Kim Wilson.

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Project Native American Mathematics Education (NAME)

Preface

This project addressed two major areas of need in educational delivery by Wayne State College (WSC) and the Winnebago Public School (WPS). The needs are summarized here as: (1) providing pre-service educators purposeful interaction with Native American children; and (2) improving the mathematics instructional program at Winnebago Public School (WPS). Ninety-five percent of the elementary education and special education majors at Wayne State College (WSC) are from Euro-American backgrounds. This project enabled pre-service educators to have direct contact with students who have a unique cultural life and learning style, work directly with the faculty at WPS, and teach students at that site under supervision.

The 21 WPS educators, grades K-6, made a definite effort to improve their mathematics instructional ability by: 1) attending in-service sessions presented by consultants in the field of Native American education, curriculum-based evaluation, and authentic assessment; 2) comparing their teaching styles with the learning styles of the WPS students; and, 3) creating the WPS instructional mathematics manual and appropriate evaluation methods for grades K-6.

Some of the parents of WPS students provided insight into the learning style of the students, and gave feedback on the teaching approaches designed by the teachers. Two parents gave valuable assistance in the evaluation of the project.

Rationale for the Project

The professional literature in education indicates that:

(a) No "Western mathematics" textbook is, by itself, appropriate for teaching Native American students;

(b) Assessment of Native American students via standardized achievement tests is inadequate; therefore,

(c) Additional instructional methodologies and evaluation procedures are needed, such as, curriculum-based evaluation and authentic assessment (Gilliland, 1999; Davison, 1998; DeAvila, 1988).

There is little extant research regarding mathematics education for Native American students (Davison, 1998). The supporting research only states that these children learn differently than Western children (Ascher, 1991; Nelson-Barber & Estrin, 1995).

One important outcome of NAME was to create a manual that would add to the resources available for Caucasian teachers of Native American children.

Construction of the Manual

The WPS educators submitted examples of their lessons. A representative group of the educators compiled the lesson examples at the close of the project year into this manual. The individual lessons were designed to comply with the curriculum guide developed by WPS, which is in compliance with the Nebraska Standards, L.E.A.R.N.S. The individual standard is presented in the left-hand column of the lesson pages.

The lesson activities are interactive, use manipulatives, and relate to the Native American culture whenever appropriate. For example, team contests, such as the "spelling bee" approach, are not truly valued within the culture; therefore, these activities are not included. Total classroom gain and individual mastery of content are appropriate. In the culture, the individual works for the good of the tribe or clan. *It educator is advised to use team contests or individual competition sparingly.*

Assessment of Student Learning

This manual focuses on authentic assessment. It is recommended that the reader obtain and use a copy of *Authentic Assessment: The Key to Unlocking Student Success* by Mark A. Baron and Floyd Boschee. It is available from Scarecrow Press, Inc., 4720 Boston Way Suite A, Lanham, MD 20706-4310. These authors define authentic assessment as: "a process where students not only complete or demonstrate desired behaviors, but accomplish them in real-life context. ....Authentic assessment can be defined as any number of methods which may be used to gather information about the performance of students. .... using authentic assessment implies that there will be 1) a mélange of teaching practices and structures; 2) multiple validations; 3) portfolios; and 4) secured tasks." p. 2 & 3.

Many times the actual implementation of the learning activity is also the assessment. The reader should remember that a paper and pencil test, a timed test, or a multiple-choice test is not considered to be authentic in nature. Baron and Boschee say that the teacher should ask, "What are we looking for when we assess students' learning?" p. 2 The authors further state this principle: "The purpose of education is to prepare students to complete life's relevant tasks and to use academic skills in concert to complete those tasks." The activities in this manual include suggested authentic procedures for the lessons. These are listed in the right-hand column of the lesson pages.

Purpose of the Manual

The WPS students' mathematics achievement scores at the end of the project compared to those at the beginning of the project showed a definite gain. This manual is designed to share the learning activities that seemed to have helped the students to achieve higher levels of mathematics skills. The participants of this project wish to share their success with you. Try some of the lesson activities, watch your students, and revise the suggested activities and assessment procedure as needed to fit your students learning styles.

We would like to hear from you. Teacher-testing is the proof of it applicability in the classroom. This is an evolving venture. Your suggestions will be welcomed.

D.J.W., Project Director

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Competency	Activity	Authentic Assessment
K.1, K.2, K.3 Count to fifty; Recognize numbers to fifty Resources: index cards tape markers	1. Let the students sit in a semi-circle around the white board. 2. Set out numbers written on index cards in the middle randomly. ex 5, 20, etc. 3. Let the students one at a time and tape up the cards in order. 4. When it's their turn they could orally state the number, and count out that many objects.	The students will put the number cards (0-50) in order with the cards.
K.4, K.5 Matching items to corresponding numbers to 10; Count objects to ten Resources: dice (2) manipulatives	1. Have the students sit in a circle together. 2. Have a set of number cubes with the numbers (1-10) on them. 3. Students identify the number they roll. 4. Students will get a set of manipulatives to match the number they rolled.	The students will identify the number rolled on a number cubes and count out the same number of objects.
K.6 Recognize & count numbers to 10 in the Winnebago language Resources: Rain Sticks Dream Catchers Picture cards of Native American objects	1. Use visuals of Native America objects. (ex. teepees, dream catchers etc.) 2. Students will say the number of objects in the pictures using the Winnebago name of the numeral.	Students will put Native American objects into groups and name each object in the Winnebago Language.

Competency	Activity	Authentic Assessment
K.7 Demonstrate the value of numbers (0-20) using concrete objects Resources: magnetic shapes index cards	1. Set the students on the floor in a semi-circle. 2. Have index cards with the numbers written (0-20) mixed together. 3. Each student will have a partner and draw a card. 4. The students will say the numbers represented by the numeral on the card and select the number of magnetic objects to match it.	Students will match the numeral written on the card to its equivalent number of magnetic objects.
K.8, K.9 Identify how numbers are used in counting Identify how numbers are used for identification Resources: Chart Paper Sheets of Paper Number Stamp Number Stickers Numbers at Play by Charles Sullivan	1. Read the book Numbers at Play by Charles Sullivan. 2. Have students locate numeral in the pictures. 3. Take a walk around the school and community and look for numerals. (ex. streets, houses, signs, etc.) 4. Go back to school and name all the places they saw and how numerals and how they are used. 5. Students draw a picture where they saw numerals used.	Students will draw pictures of somewhere they saw a numeral. They could stamp numbers on their picture or place number stickers.

Competency	Activity	Authentic Assessment
K.10 Locate first, second, and third in sequence Resources: variety of magnetic shapes	1. Gather all students around the magnetic whiteboard. 2. Have students put three different magnetic shapes in an order and explain how they are ordered.. 3. Have each student point to a shape and say its ordinal position as: first, second, or third. 4. When that's completed give each student 3 different magnetic shapes. Tell each student to the shapes in order by giving them the ordinal position of each magnetic shapre. ex. 1. Put the apple first. 2. The star second. 3. And the balloon third.	The students will put shapes in a specific order according to the teacher's directions.
K.12, K.13 identify the fractions of a whole identify the fraction one-half Resources: graham crackers gum construction paper shapes	1. Give each student a whole graham cracker. 2. Ask the students if it is a whole half of a cracker. 3. Pair up with a partner. 4. Give each pair another whole cracker. 5. Ask them to break it so each has half. 6. Ask them to decide which one is larger. 7. Use construction paper shapes and ask students to decide if it is a half or a whole.	Students will identify which piece as whole or half.

Competency	Activity	Authentic Assessment
K.14, K.15 Identify purpose of clocks; Identify numbers on clocks K.18 Demonstrate understanding of time (earlier and later) Resources: Large clock Paper plates Sheets of paper	1. Sit on the floor in a large circle. 2. Show students a large clock with numbers on it. 3. Have all students orally identify the numbers on the clock. 4. The class will make a large clock on the floor. 5. Each student will put a number where it would go on the clock. 6. Discuss times of the day; ex.; what we do at 7:00. 7. Brainstorm what we do at different times. 8. Discuss what times are morning and which are night.	Given a brad and tag board for hands, using a marker or crayons, the each student will make a clock on a paper plate.
K.16,K.17 Identify the purpose of calendars Identify the numbers on a calendar Resources: Variety of calendars Blank calendar	1. The students will name the special they will attend according to the day of the week (ex. Monday-P.E., Tuesday-Art, etc) 4. Students will individually locate numbers on the calendar directed by the teacher.	Students will make their own calendar, which includes numbers, specials, and holidays.
K.18	See Competency K.14	

Competency	Activity	Authentic Assessment
K.19, K20 Identify circles, squares triangles, and rectangles Construct congruent shapes and designs using manipulatives Resources: Pattern blocks paper	1. Students seated on the floor, provide one circle, square, triangle, & rectangle for each student. 2. The teacher will orally identify a shape and each student will pick up one. 3. The teacher makes a pattern on the whiteboard using a circle, square, triangle, or rectangle. 4. The students will copy the pattern. 5. The students will locate each shape and tell how many sides each has, and if the sides are the same size.	Each student will make a picture with pattern blocks from another picture.
K.21 Students will recognize one cup as a unit of measure. Resources: Liquid and dry measuring cups Various liquids Various dry kitchen ingredients Recipe Recipe ingredients	1. Discuss and explain a one cup measure. 2. Put different containers with the measuring cup in a center. 3. Provide opportunities for free exploration of ingredients, both liquid and dry. 4. In small groups, prepare a recipe with the students, allowing them to play with the finished product (ex. Play-dough) or eat it (ex. cookies)	Students can prepare a simple recipe by themselves. **Slime** 1 cup water 1 cup cornstarch If measured correctly the mixture will not be too runny or too thick. It is safe to eat but not tasteful.

Competency	Activity	Authentic Assessment
K.22 Compare 2 or more objects regarding height, weight, length, or temperature. Resources: Large sheets of white paper, pencils	1. Trace students' body outlines on large paper. 2. Cut out the body outlines. 3. Fasten them on the wall. 4. Have students compare the heights of different pairs of body outlines. measure the height of the two students and compare.	Students will arrange the cutouts of the class in the correct order from tallest to shortest.
K.23 Recognize spatial concepts of left/right, above/below, over/under, near/far. Resources: Teddy bear counters	1. Students will move a teddy bear counter to match the verbal direction of left, right, above, below, over, under, near and far.	Students will be able to move the teddy bear counter according to the direction. Check that the students can generalize to other objects and positions.
K.24 identify the purpose of thermometers Resources: thermometers (variety) paper	1. Bring in examples of thermometers. (ex. outside, interior, body, food) 2. Ask students why and where we use these thermometers. 3. Discuss how to take care of thermometers. 4. Show the students how to use these thermometers.	Have each student draw 2 pictures of how and where they use thermometers.

Competency	Activity	Authentic Assessment
K.25, K.26 Add sums to 10; Count using manipulatives to add sums to 10 Resources: M&M book M&M's Charts	1. Read the M&M book to the students. 2. Give each student a small box of M&M's and a chart. 3. Do problems together. (ex. Put red and brown M&M's in a line. Ask, "How many altogether?" Don't worry if students don't have exact number or say exact numbers.) 4. Do problems together.	Each student will demonstrate putting groups together with M&M's.
K.27, K.28 Students will subtract differences from 10. Students will count using manipulatives to find the difference from 10. Resources: 10 pennies misc. items with price tags toy cash register	1. Discuss and explain the toy store before opening the center. 2. Pairs of students will take turns shopping, buying 1 item at a time. 3. They will subtract that amount from their 10 pennies by giving the clerk the correct amount for the item. 4. They will count the money they have left. The clerk will then check the shoppers' subtraction and total amount left over.	Students take turns shopping at the store, demonstrating their ability to correctly subtract the price of their item from their 10 pennies, and to correctly count the amount of pennies they have left.
K.29 Identify penny, nickel, dime, and quarter Resources: Purse Real coins (pennies, nickels, dimes, and quarters)	1. Set the students in a circle on the floor. 2. Pass around a small purse 3. Each student will take out 1 coin and identify its name and value. 4. List characteristics of each coin on a chart under each coin's name. 5. Pass purse around to students to collect the coins. The students states the name of the coin as it is put in the purse.	The students will identify the name and value of real coins.

Competency	Activity	Authentic Assessment
K.30 Students will identify the cent sign. Resources: memory game price tags	1. Review the sign +, =, and cent sign. 2. Play a memory game with these signs. 3. Students will orally identify the names of the signs.	Students will circle the cent sign on real price tags.
K.31 Recognize a simple pattern in the environment Resources: Chart Paper tiles wallpaper squares	1. Walk around the school and try to find patterns in the school.(ex. tiles on floor, carpet patterns, designs on the wall, clothes, etc.) 2. List on chart paper all the patterns they found in the school.	
K.32, K.33 Sort and classify objects according to one or more attributes; Construct a bar graph Resources: Jelly beans, M&M's, cups or boxes, blank graph paper	1. Give each student a bag of jellybeans. 2. Sort the jellybeans by colors. 3. Give each student a blank graph with boxes. 4. Have students put one jelly bean in each box to make a real graph. 5. Count each color of jellybean and color appropriate number of boxes with the same color.	Each student will create a bar graph with a small box of M&M's

Competency	Activity	Authentic Assessment
NUMERATION **Whole Numbers** **Cardinals** 1.1 Identify numbers to 100, in and out of sequence. 1.2 Write numerals to 100, also before and after numbers. Resources: 100 chart 100 pocket chart Number cards to 100	1. Count numbers using a 100's chart. 1. Fill in a blank calendar. 2. Write numbers on cards to fit into pocket chart. 3. Place number cards into a pocket chart. 4. Select a number card from 1-100 and give it to a student to put in the pocket of a 100's chart.	The students can count and write numbers and place them in order in the pocket chart.
1.3 Demonstrate the value of numbers (0-20) using concrete objects. Resources: Multiple manipulatives such as craft sticks, large food beans, macaroni, or commercially obtained objects for counting Number cards 1-20	1. Give each student 20 counters and the number cards. Assisting the students to make their own number cards is a learning experience. The students will match manipulatives to number cards. 2. Direct students to group their classmates to match the number on a card.	The students will be able to match a set of concrete objects to numbers between 1 and 20.
Ordinal Numbers 1.4 Recognize ordinal numbers to the fifth place. Resources: Paper medals	1. Have a series of contests with 5 players. Then have the players stand in a spot according to how they finished the race. Assign a student to be a judge and hand out the medals accordingly. 2. Give each student 5 objects. Read a story about a race and have them place the objects accordingly.	The students will be able to place, stand and hand out medals to the 1st through 5th place winners.

Competency	Activity	Authentic Assessment
Place Value 1.5 Identify place value of one's place. 1.6 Identify place value of ten's place. Resources: Number cards 1-20 Color coded cards	1. Give the students a series of number cards and ask them to stand and tell what numerals are on the card. Ask what numbers can make up the number, e.g. 23, 20 and 3. 2. Write twenty-three and have students explain how they know it is 20 + 3. 3. Use color coded cards to help with the recognition of each place value. Ex: ten's numbers are blue, ones are red	Ask the students to write a given number and then write the number as tens and ones.
Sets 1.7 Match sets, numbers to objects and group objects and numbers; Locate specific information from charts; Count and collect information about their own environment. Make observations about data and make comparisons. Resources: Picture cards of room objects Blank number cards	1. Each student or in pairs will count some objects in the room and make a class chart with the information. Ex. Boards, chairs, desks, doors. Make a number card to represent each object. 2. Use one card for each object to make a chart. 3. Challenge others to use the chart to tell how many objects on the chart are in the room. (Ex. Boards =4) 4. Discuss the information, tell a partner something about the chart. 5. The students will answer questions about the chart. Ex. Which one was more?, fewer?, how many? 6. Continue for a week.	The students will count objects, make a number card, and help construct a chart with the information. They will also be able to locate specific information about the graph.

Competency	Activity	Authentic Assessment
Equalities 1.8 Recognize the greater than (>) sign and less than (<) sign. Resources: Number cards Manipulatives	1. Students will be asked their ages. Write on the white board. Ask, "Who has more years than ……?" "Who has less than ………? Ask the student place a greater than or less than sign by the names. 2. Ask how many people live at their house. Who has more and less? Match the sign. 3. Hand out number cards and then take turns standing and telling if you have more or less than a teacher-dictated number.	Discussion and general observation of the answers will tell the level of understanding.
Fractions 1.9 Identify the fractions 1/3 and 1/4 as equal parts of a whole. Resources: Apples; paper pizza pictures Fraction bingo game	1. Students discuss the objects that are in society. Ex. ½ tank of gas, ½ mile. 2. Give each person a pizza slice. Have them come together to make a whole pizza. Cut 3 pizzas into 1/2s, 1/3rds and another in 1/4ths 3. Cut apples in either 1/3 and 1/4 for each student. Have them explore them in small groups. Whole class discussion. 4. Cut sheets of paper into 2, 3, & 4 unequal pieces. Ask students if the pieces are 1/2, 1/3, or ¼. Compare them with sheets of paper cut into equal pieces of 2, 3, and 4.	The students will be able to identify the fractions of 1/3and 1/4 in a variety of objects.

Competency	Activity	Authentic Assessment
GEOMETRY/MEASUREMENT **Time** 1.10 Recognize time to the hour and the half-hour on both a digital and analog clock. Resources: Mini Judy clocks	1. Hand out clocks to each student. Talk about the hour and minute hand. Have them manipulate the clocks. Show 12:00, direct students to set the hands for 12:00. Continue with other hours. 2. Day 2 – review hands, and hours. Compare the length of the minute hand to that of the hour hand. Show 30 minutes and direct students to set it on their clocks. 3. Day 3 – show digital time compared to analog. Match each with their clock. 4.	The students will be able to tell time on a digital and analog clocks to the hour and the half hour.
1.11 Identify the days of the week. 1.12 Identify the months of the year. 1.13 Explore calendars to see how the time of the week and the year are organized. Resources: Blank calendars	1. Each month fill in a blank calendar to make one year. 2. Label holidays, birthdays, and special days. 3. Dance the months of the year to the "Macarana". 4. Sing the days of the week and the second time through, stop on today.	The students will be able to write and say the days of the week and the months of the year. Use their calendars each day during opening exercises.

Competency	Activity	Authentic Assessment
1.14 Understand the orientation of time (past, present, future or earlier or later) Resources: Daily activities pictures.	1. Sequence pictures of daily activities. 2. See 1.11	The student will tell and show which activity comes earlier or later, past or present?
Shapes 1.15 Construct and describe basic geometric shapes. (Circles, squares, triangle, and rectangles.) 1.16 Identify 2 and 3-D figures in the environment; Organize and display information collected; Describe in order the steps used in collecting and organizing information. Resources: Blank cards Shapes	1. The students will bring objects or pictures from home that have a square, circle, triangle, and rectangle shape. 2. Have students make card for one or two shapes in their picture or on their object. Sort eh cards by their shapes. Make cards for each group. Challenge others to try to match the shapes with the picture or objects from home. 3. Make a class display using the objects. Invite other classes to try to sort the cards and match cards to objects or pictures. 4. Chart or make a timeline of how they made their display. What did they do 1st, 2nd, 3rd, etc. See 1.39 and 1.41	The students will identify each shape. The students will be able to identify 2 and 3-D shapes from their environment. The students will organize and display information and describe the steps to make a display.

Competency	Activity	Authentic Assessment
Geometric Measures 1.17 easure 1 cup of liquid and dry measure Resources: Measuring cups Jello, hot plate Dry beans from food store	1. Display the measuring utensils; 1 cup, ½, 1/3 etc. A 2-cup measure could also be shown to discriminate the 1-cup measure. 2. Give 1-cup measure to each student. Direct them to take turns filling containers of different sizes with different sized measuring cups. 3. Assist a representative group to measure and stir to make a pan of Jello. Talk through each step. 4. The students will measure out a cup of beans to use for an art project.	The students will be able to use and identify a 1-cup measuring cup with solids and liquids.. Discuss the differences between the beans in the measuring cup (size and shape) to that when laid out flat on a paper. (Volume to area, remind the students that the beans still have volume when laid flat)
1.18 Measure objects to inches using a foot or yard rule. Estimate lengths of objects using own arm length. Resources: Foot and yard rules Paper Scissors	1. Measure and cut a piece of paper to the length of each student's arm. Measure the papers with a foot or yard to the nearest inch ruler. Have the students guess a distance within arm-lengths. Example: from their desk to the board, guess the distance in arm-lengths. Use the paper length to actually measure the distance. Compare the distances. Discuss. 2. Estimate other lengths. 3. Find actual number of inches for a variety of objects. See 1.43	The student will be able to guess a distance using their arm length. The student will be able to use a foot or yard rule to measure his/her arm length.

Competency	Activity	Authentic Assessment
1.19 Compare objects regarding height, length, weight, or temperature. Resources Objects of various lengths, such as craft stick cut into various lengths. Objects of various weights, such as rocks from the playground or environment ranging in size from very small to as large as the child can lift easily. A scale to measure weight. Thermometers Water from hot faucet in jars of various temperatures Foot rulers Continued next page >>>>>	Teach height and length, then weight, and finally temperature. This may take many days, even weeks 1. Compare lengths of objects at different positions. Direct the students to measure the sticks while horizontal on the desk. Record the lengths. Direct the students to stand one stick up-right. Measure it. Compare to the length when horizontal. Continue this task with each stick. (Note: some children this age have not yet developed the ability to conserve length consistently) 2. Present the box of rocks and the scale. Weigh the rocks and record the weight on a card. Place the card above where the rocks on the chalk tray. Direct a student to place the lightest rock in the farthest position to the left. Call on another student and continue to sequence on the chalk tray according to weight of the rocks from lightest to heaviest.. Give 3 rocks to each pair of students. Direct them to weigh and record their collection as was done in the demonstration. Charting the weights could also be done. Who has the heaviest rock? The lightest?	The students will follow directions to show their understanding of each concept.

	Continue to weigh objects to discover that size does not necessarily correspond to weight.	
Materials: Put water of different temperatures in containers Science thermometers	4. Direct the children to measure the temperature of the water with a thermometer. Record and compare as with length/height and weight. Record the temperature of the classroom on a chart for a week. Do the same for the outside temperature at the beginning of the day, at recesses and noon. See 1.21 and 1.22	
1.20 Compare relative position and spatial relationships (left/right, above/below, over/under, up/down, far/near.) Resources: Manipulatives Colored strings or yarn cut to safe lengths Continued >>>>>>>	1. Using the objects in previous lessons direct the students to a game of "Where is it?" Say: Put the tall one in your left hand and the short one in your right hand. Put the red object over the green one 2 Working in pairs, the student will tie a red string on their right wrist and right foot. Tie a blue string on their left wrist and foot. 3. Give each pair of students 4 different colored shapes tiles, or pattern blocks. Have each pair sit back to back. Designate one to be the leader first. The leader is to	

	make a design and tell the partner where he/she is placing each piece s they make the design. The partner attempts to make the same design from the oral directions. When done compare, talk, and report, taking turns as needed.	
Thermometer 1.21 Read the correct daily temperature on a thermometer. 1.22 Associate what a thermometer's use is. Resources: Thermometers	1. Students will select a city and daily find the temperatures on the internet. Graph the temperature. 2. Make a thermometer to do daily observations. 3. See 1.19	The students will read the daily temperature from a thermometer.
OPERATIONS **Addition** 1.23 Add 1 digit numerals up to 18 1.24 Add 2 digit numerals up to 99 without regrouping 1.25 dd columns of 3 numerals up to 99 without regrouping Resources: Abacus Number line White board	1. Students will be given an abacus or counting board and do addition problems together. 2. Use the white board to write problems. 3. Use a number line to add. 4. Use a hundreds chart and use arrow math to add and subtract Some students will benefit by using the *Touch Point Math* program. See References for source.	The students will do a double-digit problem with either a number line, abacus, or hundreds chart.

Competency	Activity	Authentic Assessment
Subtraction 1.26 Subtract 1 digit numbers to 18 1.27 Subtract 2 digits up to 99 without regrouping Resources: Counters such as large beans, plastic bears, macaroni shapes 1. Use objects from home as counters. Use the number line Attendance sheet	1. Have the students take attendance using the form: total number of students minus how many are gone equal how many are here. 2. Practice counting backward from 18 and all numbers less than 18.	The student correctly find the attendance.
PROBLEM SOLVING **Money** 1.28 Identify the value of a penny, dime, nickel, and quarter. 1.29 Count money to $1.00 1.30 Demonstrate the value of a collection of coins whose value is less than $1.00 Resources: Real coins from 1c to quarters; Bingo sheets with coins depicted and coin words, ex. Cent instead of the picture of the penny, etc. Beans for Bingo markers.	1. Play money bingo. The students can mark either the picture of the coin or the word called. 2. Play store. Tag items in the classroom with a price combination to $1.00. Give each student a combination of coins. Direct the student to "buy" items with their coins. For some students, pairs can combine their coins and buy more.	The students will identify and count coins.

Competency	Activity	Authentic Assessment
Patterns 1.31 Count by 5's and 10's to 100 1.32 Write numbers by 5's and 10' to 100 Resources: Paper of 3 colors	1. Trace hands on paper and write by 5's as a class. 2. Alternate colors of hands to count by 10's. Example: 2 blue, 2 red, 2 green. 3. Count by 5's and 10's in a rhythm emphasizing the second or alternate number, ex.: 5, **10**, 15, **20**, etc. or 10, **20**, 30, **40** etc. 4. Put students in a circle and have them count by ___'s to see how many times they can go around without miss counting.	The students will count by 5's and 10's. The students can put the hands in order.
1.33 Recognizing a pattern using numbers 1.34 Recognizing a pattern using objects 1.35 Identify and describe patterns. 1.36 Create patterns with shapes, numbers, colors, movement, sounds, and objects. Resources: Manipulatives such as unifix cubes, mosaic colored tiles, etc	1. Create a pattern as a class and continue on their own. 2. Write a number for each day of school and alternate colors for 2's and 3's. 3. Clap a pattern. 4. Use manipulatives to create a 2, 3 or 4 part patterns *Math Their Way* provides appropriate pattern manipulatives .	The students will create various types of patterns using numbers, colors, and sounds.

Competency	Activity	Authentic Assessment
Data Analysis 1.37 Locate specific information from graphs	See competency 1.7	
1.38 Count and collect information bout their own environment	See competency 1.7	
1.39 Organize and display information collected	See competency 1.15 and 1.7	
1.40 Make observations about data and make comparisons	See competency 1.7	
1.41 Describe in order the steps used in collecting and organizing information	See competency 1.15	
Story Problems 1.42 Recognize key words in a story problem. Resources: Chart paper	1. Make a list of common math words and symbols to put on their desk. EX: + plus, and, all together, add 2. Act out problems. 3. Circle the key words of problems written on the board. See Burger method in Appendix 4. Use RIDD strategy for story problems See Appendix.	The students will recognize key words in story problems by using their list or from memory.

Competency	Activity	Authentic Assessment
Estimation 1.43 Estimate lengths of objects to arm length	See competency 1.18	
1.44 Estimate amounts of items to 5 Resources: Jars with various objects	1. Provide students with jars filled with objects (1-5). Count the jars. 2. Compare the results. Try again with other jars.	The students will estimate objects to 5 with reasonable accuracy.

Competency	Activity	Authentic Assessment
NUMERATION **Whole Numbers** **Cardinals** 2.1Counting and writing to 1000 2.2 Sequencing numbers to 1000 Materials: Salt trays, 1000 cards with the numerals written on them	1. A student will draw a card from the pile of 1000 cards. The other students will write the next number in their salt tray with their finger	The teacher will check to make sure that the student has successfully completed the task.
2.3 Recognize odd and even Numbers 2.28 Count by 2's to 100 Materials: A roll of adding machine tape, markers of 2 different colors	1. Give students different numbers of link cubes or blocks. Have pairs put them into two rows side-by-side. Repeat with 3 – 4 different numbers. Have students sort numbers as equal lengths—even or unequal lengths- - odd. 2. Find a place where the roll of tape can be secured. Every day write a number on the tape in alternating colors. One color represents odd numbers; the other color represents even numbers. One child will state if the number is odd or even. He/she will select a number from which to start counting. He/she will end on the number added that day. The whole class may say the numbers as the selected student points to them on the tape.	Teacher observe and record accuracy per student.

Competency	Activity	Authentic Assessment
Ordinal Numbers 2.4 Identify ordinal numbers to the 10th place.	Have picture of 10 monkeys and 10 bananas. On the bananas write the words first, second, third, etc. On the monkeys, write 1st, 2nd, 3rd, etc. The students will match each banana to the correct monkey.	Flip the monkey over and the answer will be on the back as a self check.
Place VAlue 2.5 Recognize place values of 1's, 10's and 100's Materials: straws, rubber bands, plastic cups labeled ones, tens, hundreds and one blank one, a white board and 3 markers.	Each morning when counting days of school, have a child take a straw from the extra cup and add it to the ones cup. If there are 10 in the ones cup, group them together and move them to the tens cup. If there are 10 groups in the tens cup, group them together and move them to the hundreds cup. Keep a running total of days on the white board underneath the cups of straws. Use a different color for each place value.	Discuss how the items are similar, different and other ways they could have been categorized.
Sets 2.6 Group items into like sets Materials: Items from the students desk, chart paper and markers	Ask each student to select 2 things from their desks and to place them to make a class resource. Tell the students look through all of the items. Ask, "How they are alike? How they are different? Group similar items and find a word to describe each group. Create a class chart of the different items.	Check the individual student's chart as s/he participates. Interview individual students; ask him/her to explain the graph to the teacher.

Competency	Activity	Authentic Assessment
Equalities 2.7 Compare numbers up to 999 using <, > and =. Materials: Cards with numbers on them and a hand puppet.	Ask two students to stand. Give each a card to display. The child that has the puppet stands in between 2 students. The child with the puppet eats the number telling the class if it is greater than, less than or equal to the other number. Continue with another set of 3 students. Record the results on the board	Check the individual student's chart as s/he responds as the puppet.
2.8 Recognize the multiplication sign. Materials: Sets of cards with +, - or x on them. Five of each sign is appropriate for each set.	Review the + and – signs. Show the X sign and discuss it as multiplication. Add a number several times (4+4+4=9) and compare to 3X4=12). Assign the children to groups of 3. One student has a pile of sign cards. They hold one card to the other 2 students. The first student to say the correct sign earns a point. Continue through the stack of cards. The student earning most points at the end of the round first becomes the caller in the next round, etc.	Record the individual student's scores as s/he participates in the activity.

Competency	Activity	Authentic Assessment
Fractions 2.9 Identify fractional parts compared to the whole. Materials: Three equal rectangles colored as a birthday cake, cut into halves, thirds, and fourths. Cards with ½, 1/3, and ¼ written on them Note: Fractions of circles are easier to understand after working with rectangles and squares. (Cake before pizza)	The student draws a fraction card from the pile and "serves" self from the correct amount of cake. Continue until all cards are used and all students have been "served" cake.	The teacher will look to see if all of the fractions are matched correctly.
2.10 Order and compare common fractions Materials: Cards with halves, thirds, and fourths written on them; Pictures of common items pasted to tag board and cut into the same fractions.	Each student takes a turn with the cards and the pictures. Procedure: pull one fraction card then match it to a picture piece. Ex: 2/3 to two pieces of the thirds picture.	Check the student's chart as the matches are completed.

Competency	Activity	Authentic Assessment
Rounding 2.11 Round numbers to 10's Materials: Enough decks of cards with the numbers 2-9 for pairs of students.	Review all whole numbers between 10 & 20 and discuss each as to whether it is closer to 10 or 20 and which one to round it to. Give each pair of students a deck of cards. Each student flips over two cards to make a two- digit number. Then they say the number that they made and which 10's number it would be rounded.	The teacher will observe the students for an evaluation
GEOMETRY/MEASUREMENT **Time** 2.12Recognize time to 5 minutes 2.13 Recognize parts of the calendar including the days and the week Materials: Paper plates, brass fasteners, schedule for the week and 5 boxes to represent the days of the school week.	Make individual clocks out of paper plates and brass fasteners. Write "hour" on the hour hand and "minute" on the minute hand. Use the clocks throughout the day for the different subjects. "Set your clocks for 9:30. That is when we do spelling." "On Tuesday we have library. Set your clocks to 9:10 to show what time we leave." Direct the students to do this for different activities throughout the week.	Make observations of the students setting their clocks for the appropriate time. Comments by students related to exact time and day of the activity.

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Competency	Activity	Authentic Assessment
Shapes 2.14 Identify 3D shapes (cube, cone, cylinder, sphere, pyramid) 2.15 Describe and create 3-D shapes (flips, turns, slides) 2.16 Recognize congruence and similarity 2.17 Compare shapes that are similar or congruent Materials Paper, paper plates, popsicle sticks, straws, etc. and tangrams	Introduce the unit by allowing the students to experiment with 3-D objects that are used in everyday life such as pop cans, cereal boxes, party hats and balls. Students will work in small groups to describe and compare the objects in their own words. After the students have explored the objects, introduce the terms for the 3-D shapes while showing them the objects. Practice using the terms flips, turns and slides by playing a game of "I-Spy" in the classroom and outside. Students will use tangrams to make different shapes and create pictures while discussing flips, turns and slides.	After the students have become familiar with the shapes and terms, have them create 3-D shapes using construction paper, paper plates, popsicle sticks, straws, etc. Teacher observation
Geometric Measures 2.18 Measure objects to the nearest foot and centimeter Materials: Any 10 items from the classroom, rulers and chart paper	Measure 10 linear items in the classroom using inches then measure the same items again using centimeters. Compare inches to metric measurements.	The students may work alone or in partners. They will create a chart to display the information found together

Competency	Activity	Authentic Assessment
2.19 Recognize a cup, pint, quart and liter and use in measurement. Materials: Measuring cups, containers of these sizes (plastic beverage bottles, etc.); paper and pencils for recording data.	In small groups, ask the students to predict how many cups in a pint, pints in a quart, etc. Tell the students to estimate and write how many cups are in the pint, quart, and liter. Then give them measuring cups to pour water or rice into the various containers counting and recording the number of cups in each. The students will record the number of cups each container holds and create a chart.	Observe the students while they are measuring. Check their recorded data.
Thermometer 2.20 Recognize how to read a. thermometer. Materials: Thermometers and graph paper.	Place thermometers in different areas inside and outside the school. In small groups, the students will go to each thermometer to read the temperature at different times of the day. At the end of the day, lead a discussion on why the temperature varies. After the discussion, have the class chart the different temperatures found.	Note the quality of the explanations for the variations of temperature. Students can explain why and how temperature influences their lives.

Competency	Activity	Authentic Assessment
OPERATIONS **Addition** 2.21 Add 2 digit numerals without regrouping up to 99	Direct students to work in partners with 2 number cubes. Each student rolls their cubes 2 times to create a two-digit number and then add it together. Ex: 6 and 3 (63); 4 and 1 (41) added is 63+41= 104 The students take turns adding the numbers and the other student checks the answer to see if they get the same result.	Survey the students' paper recordings.
Note: Common die have 6 dots so some combinations will be more than 99. Materials: Dice, paper and pencil		
2.23 Add 2 digit numerals with regrouping up to 999 Materials: Beans, popsicle sticks 2-column chart with ones and tens printed at the tops	Give each student 10 bean counters and a place-value chart. Direct the students to make 10 dots on each of the 10 popsicle sticks to represent tens. Use the individual beans to add addition problems such as 8+7. Demonstrate trading 10 of the ones for a ten, put the ones and tens counters in the correct column on the place value chart. Continue practicing trading with the bean counters.	Observe the students making trades with the bean counters. Practice as many times as needed to observe each student
	Direct the students to count by 10's to 100 using the sticks, then combine the 10 sticks with a rubber band. Write 100 on a piece of paper and place it under the band.	
2.21 and 2.23 continued		

2.21 and 2.23 continued Materials: Place value chart with ones, tens, and hundreds columns and labels	Assign students to groups to combine their 100's bundles. Give each group single bean counters. Call a 2-digit number. Tell the students to place the sticks in the columns to represent that number. Continue with 2-digit numbers and then change to 3-digit numbers in the same method. 197 = 100 hundreds + 90 tens +7 ones / | ////// /// | ///////	
2.22 Memorize single digit addition facts to 18. Materials: Unifix cubes	Use unifix cubes to show addition facts with the same sum. Make a list of facts on the board. 1+9=10, 2+8=10, 3+7=10 etc. Explain that all of the sums will be the same. Have the students use 2 different colors to represent each number so they can see that you will always get the same answer. Say a number from 18 or less. Direct the students to make a unfix picture of the combinations.	Observe the students to make sure they responding correctly.
2.23 Add 2 digit numerals with regrouping up to 999	See 2.21	

Competency	Activity	Authentic Assessment
Subraction 2.24 Subtract 2 digit numbers with and without regrouping up to 999. 2.25 Memorize single digit subtraction facts to 18 Materials: cards to make individual flash cards	Teach the students to count backwards from 18 and each number under 18. Start this unit by solving single 2-digit subtraction problems from 18, then 28, 38, etc. Solve 2-digit subtraction from 3-digit numbers without regrouping, then with regrouping. Some students may need to use the touch points to count backwards to solve the subtraction problems Students make their own flash cards to leave in their desks to be able to practice whenever they have free time	Observe the students solving the problems.
2.25 Memorize single digit subtraction facts to 18	See 2.24	

Competency	Activity	Authentic Assessment
PROBLEM SOLVING **Money** 2.26 Count money amounts up to $3.00 Materials: Food containers, real money—each student should have 25 pennies, 20 nickels, 10 dimes, 4 quarters, 3 bills, and 1 half-dollar. Place these in plastic zipper sandwich bags with the students' name written on a press label. The money should be counted back to the teacher at the close of every session and the bags stored securely.	Start the unit by calling an amount of money and asking the students to place that amount on the desk on a paper sheet. Continue with many combinations. Several days may be used with this activity. (Counting back to the money to the teacher is a real activity with money) The students can play store with real food containers. They have to count out the money to buy the items. When they buy an item, the person who is selling the groceries will check to make sure they were given enough money. Then they can switch roles so the other person can practice buying items.	Monitor the students' work as the numbers are called and they count the money to represent that number. Check the competency chart.
2.27 Add and subtract money amounts up to $3.00 See 2.26 Materials: store items, money	Play store. The students will pick 2 or more food items to buy. They have to count out the correct amount of money. The students can also sell some of their things so they can practice subtracting.	Teacher observation

Competency	Activity	Authentic Assessment
Patterns 2.28 Count by 2's to 100. Write to 100 by 2's Materials: salt tray, sandpaper, paint	See 2.3 In math centers, have the students practice writing their numbers on sandpaper, salt, using paint etc.	Teacher observation
Charts 2.29 Construct a graph or a chart Materials: weather chart, markers	During calendar time, have the students color in a chart with the specific weather type. Add to it each day and change it each month. Compare them as the year goes along.	Class discussion and observation as they color the chart.
Story Problems 2.30 Identify clue words in a story problem Materials: story problem cards, highlighters or crayons	Teach **RIDD** strategy and the Burger problems solving method (See appendices) The students will take a laminated card with a story problem on it and highlight the key words in the problem using the above methods. Solve the problem writing each problem and their answer on a sheet of paper.	The students will show the teacher their answer sheet. If they are correct. For some students, each card may need to be checked individually, then the student can get another card. If not, they have to try again

<table>
<tr><th>Competency</th><th>Activity</th><th>Authentic Assessment</th></tr>
<tr><td>2.31</td><td></td><td></td></tr>
<tr><td>Estimation
2.32 Estimate lengths to one foot</td><td>Place articles of various lengths on a table. Allow the students to look at the things carefully. Tell the students to write on a piece of paper the items that they think are 1 foot. When everyone is finished, tell the students to measure the items to see if they are correct. Compare the differences for each article.</td><td>Observe the students as they are guessing and measuring all of the items.</td></tr>
<tr><td>2.33 Estimate amounts to 20

Materials: Different items to put in jars, transparent jars.</td><td>Give students a transparent jar and allow them to put a different number of things in their jar. Then have the rest of the students estimate how many things are in the jar. Write the estimates on the board.</td><td>Observe the students as they count out their things and as they estimate how many things everyone has in their jar.
Ask, "How do we use estimation in real life?"</td></tr>
<tr><td>2.34 Solve addition and subtraction problems that use letters, boxes or symbols to represent any number.

Materials: Cheerios, Fruit Loops, cards with numbers on them</td><td>Use Cheerios or Fruit Loops and number cards to make up problems. The student will use one number and a piece of cereal for the problem and use another number card for the answer<table><tr><td>_____---
?</td><td>+</td><td>7</td><td>= 9</td></tr></table>
e.g. X + 3 = 8</td><td>Observe as the students use the manipulatives to create and solve the problems.</td></tr>
</table>

Competency	Activity	Authentic Assessment
NUMERATION **Whole Numbers** **Cardinal** 3.1 Count and write numbers to 10,000	Play " Order Up" game from *100 Activities for the Hundred Number Board*, page 3. Use numbers from the hundreds chart and describe them in tens and ones.	Walk around the community and practice reading numbers that the students find. Have the students find numbers throughout the school. List the numbers and discuss the value of each digit in the number.
3.5 Recognize place value to the ten thousands place (10,000) Materials: beans, cups, bowls, dice, paper, *100 Activities for the Hundred Number Board; Mathematics… A Way of Thinking* See References for sources of cited materials.	Make lines on a paper to represent the ones, tens, and hundreds. Roll a die and determine where to place the number rolled in the place value chart. Discuss how a number can change by placing the digit in various number positions. Direct the students to play against each other to build the largest or smallest numbers. Demonstrate place value using beans, cups, and bowls using instruction in *Mathematics… A Way of Thinking*-for grouping activities. See activities for competency 3.6 and 3.9	The teacher should observe students to see if they try to put the largest number rolled in the hundreds place. Ex. For numeral 124 there should be 100 beans in one cup, 20 beans in another cup, and 4 beans in a third cup.

Competency	Activity	Authentic Assessment
3.2 Identify odd and even numbers up to 100 Materials: *100 Activities for the Hundred Number Board*, graph paper	Use lesson 10 and 11 from *100 Activities for the Hundred Number Board.* After collecting numbers from the staff members, teach the students about bar charts. A chart should include a title, labels, numbers, etc. Graph the quantity of odd an even numbers.	Direct the students to locate numbers written around the school and determine if the numbers are odd or even. The students can also ask staff members their favorite numbers and decide if those numbers are odd or even. This information can be recorded and a chart can be made showing the results of how many odd numbers and even numbers.
3.3 Recognize counting patterns of 2s and 5s Materials: unifix cubes, beads	The students will write counting patterns. The class can state the counting patterns aloud in a group. The students will practice by completing patterns that are written on the chalkboard.	The students can demonstrate various counting patterns by using unifix cubes. The teacher can start a pattern and the students can complete the next set. Upon completion of the pattern, the class can say the counting pattern aloud. This activity can be done using beadwork also.

Competency	Activity	Authentic Assessment
Ordinal Numbers 3.4 Identify ordinal numbers to the fifteenth place Materials: Unifix cubes	Use students to learn about first, second, third, etc. Have the students stand in a line and discuss who is first, sixth, etc. Continue to do this activity until the students have a good understanding of the concept. Give the students a red, blue, green, yellow, black, brown, white, orange, etc. unifix cube. The teacher will direct the students to place the cubes in a certain order. Then the class can discuss which unifix cube is first, second, third, etc. If time allows, the children can develop a pattern, and ask a partner which is first, fourth, etc.	Take the class out to the parking lot and have individual students tell which car is parked in the first space, second space, fourth space, etc.
Place Value 3.5 Recognize place value to the ten thousand's place. (10,000	See competency 3.1	
3.6 Recognize expanded notation and illustrate with numbers. Materials: Calculator, base ten sets	Using base ten numbers, the students can use base ten sets to demonstrate given numbers. After the number is visually demonstrated, the class can determine the value of the cubes, ten sticks, and ones. Those numbers can than be used to illustrate expanded notation on the board. The students can then play a game in which they demonstrate the number using base ten sets and expanded notation. One child builds the number using a base ten set and the other one uses a calculator to demonstrate the number.	The class can go on a number hunt through the school or around the community. The students will need to compile a list of numbers that they find. When returning to the room, the numbers can be used to illustrate expanded notation. The numbers can also be used to write the next three, one hundred more, ten less, etc. This will demonstrate an understanding of the base ten system.

2

Competency	Activity	Authentic Assessment
Equalities 3.7 Recognize the division sign Materials: division flashcards; paper cookies *The Doorbell Rang* *Math Practice Games* Frank Schaffer folder activity (See references)	To introduce division, read the story, *The Doorbell Rang*. While reading the story, use paper cookies to determine the division problem. Upon completion of the story, the students can complete activities in the Frank Schaffer book folder. Division can also be demonstrated using students in the class. Depending upon the number of students, the teacher can give a division problem that can be solved by acting it out. The students can practice division facts by playing "Around the World" with flashcards.	The students can make division games from *Math Practice Games*. The students can demonstrate division by using unifix cubes. The teacher will state a problem and write it on the board. Each student will use unifix cubes to determine the answer.
3.8 Compare numbers to 10,000 using >,<, or =	Write two numbers on the board, and have the students take turns circling the larger number or smaller number. Once they have an understanding of this concept, introduce >, <, and =. Then use the same method as above to practice using the correct sign	Using the numbers built in 3.1, the students can determine greater than, less than, or equal to.

3

3

Competency	Activity	Authentic Assessment
Fractions 3.9 Order and compare common fractions Materials: fraction stacks, circles, Fraction dominoes	Use fraction stacks or fraction circles to discuss equality of fractions. Practice doing several examples together.	The children can play fraction dominoes to practice ordering and comparing fractions.
3.10 Recognize the fraction equalities with >,<, or = Materials: Hershey's Fraction book, paper, colors	Fold paper into parts. Ask students to color parts of their paper. Ex: color 1/4th, color 2/3rds, etc. with < > = between the displayed factors Compare factors/ Tape papers on the board and have students discuss how they know each is colored and labeled accurately.	Write the fraction for each paper and use the sign, >, <, or =, to compare the fraction. Use the Hershey's Fraction Book to compare fractions.
3.11 dd and subtract like fractions Materials: fraction sets.	Demonstrate how to add/subtract fractions on the chalkboard with fraction sets. Do several examples together. Have the children tell the steps.	Use fraction sets to practice adding like fractions. Add and subtract like fractions on the board.
Rounding 3.12 Round numbers to 100's	Use a number line and explain rounding by asking the children if 14 is closer to 10 or 20. Do several examples. After the students understand rounding to ten introduce rounding to hundred.	Using the numbers generated in 3.1, have the students practice rounding those numbers and explain why it is 2o and not 1o or vice versa..

4

Competency	Activity	Authentic Assessment
Decimals 3.13 Recognize the tenths place of decimals Materials: dimes, fraction sets of ten, and advertisement.	Use fractions to demonstrate items being divided into ten. Show the students how 1 divided by 10 equals .1 and use this to lead into that there are 10 dimes in one dollar. Practice writing the value of one dime, two dimes, etc. to a dollar using the decimal point. Ex: .10, .20, .30 etc. e.g. 1 dime or $.10 or 10 c This is 1/10th of a dollar. It confuses children to call it 10 c or 1 dime. It is Okay to say they are equal amounts with different names.	Show the children various numbers of dimes and have them write the amount. Then discuss what number is in the tenths place. Using your daily schedule, the teacher can have the students set the clocks to five minutes before cluster or ten minutes after lunch, etc.
Time 3.14 Recognize time to the minutes before and after the hour. Materials: student clocks, clocks of varying types, book about clocks/time Continued >>>>>	To introduce the activity, the teacher could bring in various types of clocks. The class can then determine the use of clocks and why some people might think they are important to the world. Review as a class about how to tell time. Give each student a clock and practice setting the clocks to quarter, half-hour and hour times. The teacher can write the time on the board and say it aloud. When students have an understanding of the activity above, then teach them about minutes before an hour and after the hour. The children will need to practice this by following the same procedure as above. Time flashcards can also be used to review this concept.	Using numbers from an advertisement, discuss which digit is in the tenths and ones place value. There are numerous books about time in publish. Chose one of the books and read it aloud. As the teacher is reading aloud, the students can set their clocks to times stated in the story.

	Challenge students to make a clock that has hours 1-12 marked in the inner circle and minutes 1-60 on an outer circle. Have them use this to explain various ways of telling time. (Recommended by Grace Earth)	
3.15 Recognize century, decade, and year. Material: newspaper, index cards	To introduce each word, play a matching game. Allow the students to work with a partner to match 100 years, 10 years, and 365 days to the terms century, decade, and year. The teacher can print those items on index cards. The teacher will need to monitor the pairs as they work and tell them if they have one, two, or three matches correct.	As a homework assignment, the students can locate the name of a community member or family member who, if living would be a century old, and those who are a decade old, and a year old. The newspapers can be used to read information that happened 100 years ago, one decade ago, and one year ago. This information can then be used to write who, what, where questions. Other students in the class can then answer the questions.
Shapes 3.16 Solve problems with geometric figures using congruence and similarity	Draw a geometric shape on the chalkboard. Ask the students how we can draw another figure that is exactly like the one on the board. Students might try to draw, but will see one way is to trace. Use acetate paper and a marker to trace it. State that these figures are congruent.	Students can use different types of paper (wall paper, construction paper, etc.) and make congruent figures.

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Competency	Activity	Authentic Assessment
3.17 Match lines of symmetry (flips, turns, slides) Materials: acetate paper, wall paper, construction paper	Have students cut two identical triangles from graph paper. Use the two triangles to demonstrate flips, turns, and slides. The teacher can show the students what action to perform with the triangles. Once the students understand each concept, have them demonstrate it by telling them to turn, slide, or flip. Have students create flip, turn, or slide problems for classmates to solve..	The students can use graph paper to design two identical objects. They then lay them on their desk by turning, flipping, or sliding one of the objects. The class goes to each desk and determines if the object was turned, flipped, or slid.
3.18 Create 2 and 3 dimensional shapes. (cubes, cone, cylinder, sphere, pyramid) Materials: Geometric shapes, clay	Uses examples of geometric shapes. Try to match the name with the shape. Find two and three-dimensional shapes around the room. Discuss their names as you find them.	Students can create dimensional shapes using clay.
3.19 Identify parallel and perpendicular lines. 3.20 Create parallel and perpendicular lines. Materials: sidewalk chalk	Draw perpendicular and parallel lines on the board. Explain what they are called. Find parallel lines and perpendicular lines throughout the classroom (lines in the bricks, on shelves, etc.)	Teacher observes students drawing perpendicular and parallel lines on the sidewalk with colored chalk.

6

Competency	Activity	Authentic Assessment
Geometric Measures 3.21 Identify units of measurement: yard, meter Materials: meter stick, yard stick	Review yard sticks/ meter sticks. Discuss what you could measure with them.	Practice measuring objects in the room using both yards and meters.
3.22 Measure objects to the nearest ½ inch and cm. Materials: overhead ruler, rulers for individual students, objects to measure	Use an overhead ruler and discuss where each inch is. You can have the students point to each one. Ask where ½ inch would be. Make sure the students have an understanding of the fraction ½. The students should show where the half-inch marks are located and the spaces that represent halves. Do the same for cm.	Students can measure smaller objects in the room. List the objects on a paper or the board. The information can be used in a chart.
3.23 Identify liquid amounts such as quart and liter Materials: pint-quart jar, measuring cup, liter bottle, milk jug,	Bring a pint jar, measuring cup, liter bottle, gallon milk jug, and a quart jar. Have the students guess how many of each fit into each of the others. Record the guess on the board. Measure and record results.	Students use water and solid measurements to discover how much a container holds.
3.24 Identify lb. and oz. as weight measurements. Materials: small food scale, pound scale, food items to measure, cereal boxes	List different things that students think weigh a pound or ounce. Have a ounce scale and pound scale. Practice measuring some of the items. Ask the students if they want to change their predictions after measuring three or four items. Compare the weights using < > = or ()	Compare the weight pm cereal boxes using >, <, or = Students weigh different items such as fruit, M & Ms, pound loaf of bread, etc.

Competency	Activity	Authentic Assessment
3.25 Identify perimeter of a shape in inches and centimeters. Materials: milk cartons	Use milk cartons to construct small houses. Explain that they are going to measure the distance around their house. This is called the perimeter.	Students construct houses. Then measure the perimeter in inches and centimeters Measure the perimeter of their desk tops and other objects in the room.
3.26 Identify area of a shape in inches and centimeters. Materials: graph paper, ruler with centimeters	Use centimeter squared graph paper. Students outline one of the small squares. Use their centimeter rulers to measure the length and width of it (1cm. X 1cm). Tell the students that because this square is 1 centimeter on each side, we call it a square centimeter. The area of an object is measured with squares. Include more examples, 3x3 square.	Trace 4 squares. Tell the area of it. Continue measuring and recording the area on the chart. Compare perimeter to area..
3.27 Read the temperature on a thermometer using the Fahrenheit scale 3.28 Identify the existence of a centigrade scale. 3.29 Demonstrate positive and negative numbers using a thermometer Materials: Graph paper, thermometers, overhead thermometer	Begin by showing students different types of thermometers. Allow time to discuss the use of each thermometer. Then use an overhead thermometer to review how to read temperatures. Use both negative and positive temperatures. The class should read several together. When everyone understands, students can set the thermometer to temperatures of their choice. Other students can read the thermometer.	The students can chose four or five spots to place thermometers in the classroom or building. Throughout the day, individual students read the temperature to the class. Discuss the reasons for the differences. This information can be recorded and used to make a chart.

8

Competency	Activity	Authentic Assessment
OPERATIONS **Addition** 3.30 Add 4 digit numerals with/without regrouping up to 9,999	Review single digit addition by playing "Around the World".	Have each student bring a snack to school. From the package the snack is in, have the students pick something from the nutrition label, e.g., fat, calories, vitamins, etc. Ask students if they ate their snack and two others, how much fat, or calories they would consume? Have them make and solve other problems.
3.31 Memorize addition facts to 20 Materials: flashcards, *Touch Math sheets, Touch Math* video, grocery ad, snack, *100 Activities for the Hundred Number Board* 3.31 Continued	Introduce two-digit addition by using the *Touch Math* method. Have the students watch the video and do practice sheets together as a group. Another method of teaching addition is by using the hundreds board. Complete the activity called "Sum Slide" from *100 Activities for the Hundred Number Board,* lesson 48. As the students progress, have them add larger numbers.	Take the students to the parking lot and record numbers on license plates. The numbers can be added. Using a grocery ad, students can determine how much money will be needed to buy a list of certain items

9

Competency	Activity	Authentic Assessment
Subtraction 3.32 Subtract 4 digit numbers with/without borrowing up to 999 3.33 Memorize subtraction facts to 20 Materials: flashcards, computer games, Internet access, beans, cups, bowls, *Mathematics…A Way of Thinking* See references	Write an example problem on the chalkboard to demonstrate 4-digit subtraction. Start with the ones and point to the top number of the problem. In each place value position, have the students circle the larger number. Tell them that if the larger number is on the bottom that you must regroup. Use *Touch Math* to demonstrate how to regroup. Practice problems together on the chalkboard. *Mathematics…A Way of Thinking* can be used to demonstrate subtraction using beans, cups, and bowls. Demonstrate how to use *Touch Math*. Practice counting backwards from 18 by hopping and counting, or walking backwards and counting.	Students can use little chalkboards to practice. Then read the problem back to check. Make flashcards. Practice with partners. Play "Around the World".
Multiplication 3.34 Memorize multiplication facts to 6 3.35 Identify multiplication facts to 10 3.36 Multiply 2 digit numbers by 1 digit numbers. Materials: Touch Math video, unifix cubes, sentence strips, flashcards	Use flashcards and internet games such as Fun Brain. Play games on the computer. Introduce multiplication by watching the *Touch Math* video. Practice the multiples of numbers by saying them aloud. Have the students work with a partner to write the multiples of numbers on sentence strips. Then hang the sentence strips on the wall for future reference. Teach the children how to do multiplication by using the Touch Math idea. Students can also use unifix cubes to solve multiplication problems.	The students will complete a multiplication puzzle from *Multiplication: Puzzles and Practice.* Have students create story problems about multiplication. An example is if there are 5 new classrooms with 4 students in each one, how many students are there? Once the students write the story problems, other kids can solve them. Play "Around the World".

Competency	Activity	Authentic Assessment
Division 3.37 Memorize division facts up to a divisor of 6 3.38 Identify division facts to 10 3.39 Identify the remainder in division 3.40 Divide 1 and 2 digit numbers with a 1 digit number Materials: *Mathematics…A Way of Thinking*, tiles	Refer to competency 3.7 Refer to competency 3.7 Using the activity for division from *Mathematics…A Way of Thinking*, page 55, lesson 6-7, the students use tiles to create and record division problems. Lessons 6-8 to 6-11 may be used to enhance the students learning of division. *Touch Point Math* video to teach long and short division	The teacher will state a problem and will write it on the board. Students will then solve the problem, and the teacher will monitor their progress. After completing a few, the students can be asked to develop the division problem.
PROBLEM SOLVING **Money** 3.41 Count change up to $20.00 3.42 Add and subtract money up to $20.00 Materials: Magnetic money, play money, envelopes	Use real money to teach how to count back change from $1.00. Practice several together as a group. As the students understand, increase the amount of money to count. Use the money to have children practice counting money back to a partner. The students can work with a partner to count money in an envelope and pretend they spent that much at McDonald's. They paid with a twenty-dollar bill and must calculate how much change they would receive. The amounts of money on the envelope can be added on a chalkboard and then counted to check their work. (See Grade 2 for method to prepare money bags for students to use).	The students can work with a partner to count money in an envelope and pretend they spent that much as McDonald's. They paid with a $20.00 bill and must calculate how much change they would receive. The amounts of money on the envelope can be added on a chalkboard and then counted to check their work. Cut picture of articles from newspaper or flier ads that have the price printed on them. Use these to count change.

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Competency	Activity	Authentic Assessment
Charts 3.43 Collect, construct, and interpret data for tables, charts, and graphs	Refer to competency 3.22, 3.27, 3.28, 3.29, 3.2	
Story Problems 3.44 Identify clue words in a story problem.	Refer to competency 3.34, 3.35, 3.36 See references and appendices for RIDD Strategy and the Burger problem method.	
Estimation 3.45 Estimate the lengths of objects Materials: Ruler, reference books	When doing the measuring competencies, have the students estimate the length and then measure each item to determine the exact length.	Have the students estimate the lengths of various animals. Estimate the length in the hallway and then research the actual length. Measure the actual length and compare the estimate to the real measurement.
3.46 Estimate amounts to 100	Refer to competency 3.12	
3.47 Compare estimated numbers to real objects	Refer to competency 3.45	
Algebraic Concepts 3.48 Identify indicators of multiplication (., /, *)	Refer to competency 3.34, 3.35, 3.36	
3.49 Identify patterns in multiplication	Refer to competency 3.34, 3.35, 3.36	

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<table>
<tr><th>Competency</th><th>Activity</th><th>Authentic Assessment</th></tr>
<tr>
<td>NUMERATION
Whole Numbers
Cardinal
4.1 Read and write numbers to the millions.

Materials: a large laminated chart like the model at the right, erasable marker

4.3 Identify place value to the millions

Materials: decks of cards with numbers written from hundreds to millions.</td>
<td>Review numbers to 999 thousand using the chart below. Have students say and write the value of each digit according to its place. Do as many numbers as needed.
<table>
<tr><th colspan="3">Thousands</th><th colspan="3">Ones</th></tr>
<tr><td>h</td><td>t</td><td>o</td><td>h</td><td>t</td><td>o</td></tr>
<tr><td>1</td><td>0</td><td>7</td><td>4</td><td>7</td><td>3</td></tr>
</table>
Introduce the millions place values
<table>
<tr><th colspan="3">Millions</th><th colspan="3">Thousands</th><th colspan="3">Ones</th></tr>
<tr><td>h</td><td>t</td><td>o</td><td>h</td><td>t</td><td>o</td><td>h</td><td>t</td><td>o</td></tr>
<tr><td>2</td><td>8</td><td>5</td><td>1</td><td>0</td><td>7</td><td>4</td><td>7</td><td>3</td></tr>
</table>
With a partner, verbally identify the place & value of an underlined number.
Fill in the missing numbers on a number grid starting with a number above 10,000.

See 51, 5.2, 5.3</td>
<td>The teacher will observe as the students complete this assignment.

The teacher will observe as the students complete this assignment.</td>
</tr>
<tr>
<td>4.2 Recognize counting patterns

Materials: grid paper to 100 and two different colored markers</td>
<td>Assign student to pairs. Distribute grid to each student. Direct the students to color multiples of 3 red, and multiples of 4 blue.
This activity can be repeated with a new grid for any other 2 multiples, e.g. 5 and 6s.</td>
<td>Teacher will observe and listen to the groups to check for accuracy</td>
</tr>
<tr>
<td>Place Value
4.3 Identify place value to the millions</td>
<td>See 4.1</td>
<td></td>
</tr>
</table>

Competency	Activity	Authentic Assessment
4.4 Identify place value to 1000 using expanded notation Materials: Cards with expanded notation and a deck with same number sentences in short form	Play matching game with expanded notation cards. "Concentration" is an example of such a game, or "Old Maid" approach.	Teacher observation
4.5 Identify inequalities <,> and = Materials: A deck of cards for each group	The students will play war to demonstrate knowledge of greater than, less than and equal to signs.	Teacher observation
4.6 Illustrate fractional parts of a whole 4.7 Recognize denominators of fractions like and unlike 4.8 Identify fractional parts: numerator and denominators 4.9 Compare fractions using <, >, and = 4.10 Add and subtract like and unlike fractions	See competency 3.10	
Rounding 4.11 Round numbers to 10,000 Materials: Dice	Students will roll the dice 5 times to create a number. A partner will round to the nearest 10,000. Take turns.	Teacher observation
Decimals 4.12 Identify the meaning of decimals	Look up the word decimal and fraction in the dictionary and re-write the definitions in easier terms with a partner. Have students show conversions of simple fractions with calculation and picture to show ½ & .5 are equivalent and others.	Teacher observation

Competency	Activity	Authentic Assessment
4.13 Compare decimals to fractions 4.14 Recognize the tenths and hundredths place of decimals 4.15 Add and subtract decimals 4.43 Identify all coins and paper money up to $100 4.44 Describe how to make change from any combination of money up to $100	Set up a classroom store students will buy and sell items from "merchants" within the room. All merchants will then make change for the items that were purchased.	Teacher observation
GEOMETRY/MEASUREMENT **Time** 4.16 Compute delayed time to the half-hour and hour 4.17 Tell the correct time to the minute Materials: a daily schedule	Students will look at a daily schedule and compute how many hours until each subject.	Teacher will observe the students computations.
4.18 Identify the time zones in the United States 4.19 Calculate time in two different zones Materials: map, globe and phone book	Using a map, globe, and phone book, locate your time zone, determine the time in each zone. Calculate the difference to the student's time zone in USA.	Teacher will observe the students' calculations.

Competency	Activity	Authentic Assessment
Shapes 4.20 Identify 3-D geometric shapes (sphere, cone, cube) 4.21 Describe and create 2 and 3 dimension shapes Materials: construction paper	Students will show real life 3-D shapes and with a partner or in small groups create 2 3-D shapes using construction paper.	Teacher will observe the students as they create shapes.
Angles 4.22 Identify angles Materials: protractors	Students will list 10 things around the room that are at 90 degree angles.	Teacher will observe students' selections.
4.23 Analyze, compare, and solve problems with congruence, symmetry, similarity and simple transformations 4.24 Identify and draw points, lines, segments, ray, and angles 4.25 Identify parallel and perpendicular lines Materials: cards with definitions on angles, lines and symmetry	Classroom discussion: "What is a point, line, ray, line segment, and angle?" Students can make cards with definitions and samples for these geometric terms. Students find objects that represent the geometric terms.	Teacher will lead the discussion and observe students as they use their flash cards.

Competency	Activity	Authentic Assessment
Geometric Measures 4.26 Draw lines to a given length 4.27 Measure objects to nearest ½ foot, foot and yard Materials: string, yardsticks	Use various lengths of yarn or string. Students will measure yarn or string to nearest ¾ inch, ½ foot, 1 foot and 1 yard.	Teacher will observe students and measure their lengths of string for accuracy.
4.28 Measure liquid amounts up to a gallon and liter 4.29 Convert liquid amounts to gallons Materials: various containers, measuring cups	Students will choose from various containers and measure how many cups in each and convert to liters and gallons.	Teacher observation.
4.30 Convert ounces to pounds Materials: sand	Students will measure sand in ounces and tell how many pounds it is closest to.	Teacher observes students weigh and convert pounds and ounces; e.g. 18 oz. to 1 lb 2 oz.
4.31 Calculate perimeter of a shape in inches and centimeters 4.32 Calculate area of a shape in inches and centimeters Materials: metersticks, dictionaries, folders	Students will find the perimeter and surface area of the cover of a dictionary, one side of an open folder, and the floor of the room.	Students will find the perimeter and area of a dictionary, a folder and the room.

<table>
<tr><th>Competency</th><th>Activity</th><th>Authentic Assessment</th></tr>
<tr><td>OPERATIONS
Addition
4.33 Add 5 digit numerals with/without regrouping</td><td>Using a deck of cards to generate random 5 digit numbers, students will add and subtract those numbers, some with regrouping, and including 3-number problems.</td><td>Teacher will observe the process that students use to get an answer.</td></tr>
<tr><td>4.34 Add 3 digit columnar problems

Rucker/Dilley/Lowry (1988) <i>Heath Math</i> 6 ed. Lexington, MA

(Continued)</td><td>Review the touch points for <i>Touch Math</i>.
Review the process of adding using <i>Touch Math</i>.
Introduce 2 and 3 digit addition using the flash card game.

Draw the chart on the chalkboard with at least 2 places (ones and tens place).

.Draw a card with a digit of 0 to 9 written on it.
Tell the students to write each number as it is called into one of the boxes. Once a number is written it cannot be changed.

After 4 digits have been called, the students are to add the digits together. Ex: 42+61=103<table><tr><th>tens</th><th>ones</th></tr><tr><td>4</td><td>2</td></tr><tr><td>6</td><td>1</td></tr></table>Another student may have written it like the example below:<table><tr><th>tens</th><th>ones</th></tr><tr><td>2</td><td>4</td></tr><tr><td>1</td><td>6</td></tr></table>24+16=40
Recognize the students with the largest sums.
Continue calling numbers, adding, and recognizing students' numbers.</td><td>Teacher observes if students try to record numbers using a pattern and how they add.</td></tr>
</table>

4.34 continued	Draw a Tic-Tac-Toe chart on a large piece of paper or on the sidewalk. Write the digits 0-9 on it. Ex: 1 | 5 | 7 6 | 2 | 9 4 | 8 | 3 Throw a marker (bean bag, rock, etc.) on the chart. The students record the number in a chart like the one above. Add the digits horizontally, vertically, and diagonally. "Are the sums similar or different?" Have students explain why.	Observe how students add and listen to their reasons on how sums vary or don't in different directions. Challenge the student to see if they can arrange the digits from 1-9 so that the sum is the same in all directions (Magic Square)
Subtraction 4.35 Subtract 5 digit numbers with/without regrouping Materials: decks of cards Bundles of 100's, 10's, and ones straws	Review subtraction using the *Touch Math* format. Count backwards from 18, 28, 38, etc. Ex: write 364-128 on the board. Using placeholders and straws, show the number 364. Ask a student to subtract the ones. This requires regrouping. Assist the student to remove one bundle of ten and add 10 straws to the ones holder. Proceed with subtraction.	
4.36 Add and subtract a two process problem Materials: number cubes with different numbers 1-9	Students will roll the number cube 3 times. They will need to add the first two numbers and subtract the third number.	Teacher will observe how the students add and subtract. Notice students who may invent negative numbers, e.g. roll (1, 2, 6) and say 3 in the hole

Competency	Activity	Authentic Assessment
Multiplication 4.37 Memorize multiplication facts through 12 4.38 Identify multiplication facts to 12 Materials: counting markers, e.g. large beans, toothpicks,	Students will play Around the World with multiplication and division facts through 12. Review *Touch Math* sequence counting for numbers sets from 2's 12's Tell the children to make 2 piles of 8 objects. Write 2x8 and 8x2 and then tell them to look for a pattern to add or multiply; e.g., (2, 4, 8, 16) visualized or think 2 groups of two is four, 2 groups of four is eight, 2 groups of eight is sixteen, etc.) Continue through all numbers. Direct students to write story-problems using multiplication facts.	Teacher will observe if students give answers faster than 3 seconds, count on fingers or try to use a methods other than counting. Observe how students create patterns to solve problems.
4.39 Multiply 3 digit numbers by 1 digit number	See 4.40	

Competency	Activity	Authentic Assessment
Division 4.40 Memorize division facts through 12 4.41 Identify division facts to 12 Materials: multiplication and division flash cards 4.42 Divide 1, 2, and 3 digit numbers with or without a remainder by 1 digit Materials: cards	Students will make a matching game of multiplication or division cards. They will play with a partner.	Teacher will observe the strategies they use to solve the problems.

Competency	Activity	Authentic Assessment
PROBLEM SOLVING **Money** 4.43 Identify all coins and paper money up to $100.00 Materials: paper and cardboard replicates of coins and bills through $100 in bags for each student (ten 10s, five 20s, five 5s, and ten 1s) One set of real coins though $1.00 for each student Cards with various amounts of costs for items	Play matching games with the coins and bills. Use simulated money to teach how to count back change from $100. Practice several together as a group. As the students understand, increase the amount of money to count. Use the money to have children practice counting money back to a partner. The students can work with a partner to count money in an envelope and pretend they spent that much at their favorite store. They pay with combinations of bills and coins. They must calculate how much change they would receive for each time on the cards. The amounts of money on the cards can be added on a chalkboard and then counted to check their work. (See Grade 2 for method to prepare money bags for students to use).	Cut picture of articles from newspaper or flier ads that have the price printed on them. Use these to count change.
4.44 Describe how to make change from any combination of money up to $100.00	See 4.43 above	

Competency	Activity	Authentic Assessment
Charts 4.45 Interpret numerical data from charts, graphs and tables 4.46 collect data to display on a chart, table or graph Materials: 1 bag of M & M's for each student, sticky dots	Students will estimate how many M & M's are in a bag and then how many there are of each color. Students will create a dot graph using the actual data. A dot graph is a graph where one sticky dot is placed for each data point (e.g. each student's total for each color of M&M is placed on an X-Y axis)	Teacher will observe how students place dots and what students explain for each data point.
Story Problems 4.47 Eliminate unneeded information from a story problem Materials: story problems, highlighters.	Using provided story problems, students will high light the necessary information and cross out extraneous information. Additional instructional information is available in the appendices for the Burger method of story problem solving and for the Jackson RIDD strategy.	Teacher will observe and listen to students reasons for inclusion and exclusion of information.
4.48 Estimate addition and subtraction problems	Have students state and record their estimated solution to the individual problems. Calculate the problems and then compare the estimate to the actual calculation.	Teacher will observe the students comparisons of the estimates and the actual calculations. Do they estimations become more accurate?
ALGEBRAIC CONCEPTS 4.49 Identify examples of where positive and negative numbers exist Materials: cards with positive and negative numbers	Make a human number line by giving each student a positive or negative number card. Have them lineup in order. Have students trade cards and repeat.	Teacher will observe how students know or don't know where to position themselves.

Competency	Activity	Authentic Assessment
4.50 Identify symbols of multiplication and division Materials: set of cards for each students with X and ./. on them	Pairs of students take turns displaying the symbol card to the partner. The partner must state the name of the symbol within 3 seconds to score. Partners trade roles.	Teacher will observe student to determine how quickly they are recognizing the symbols. For variation, include + and – cards.
4.51 Solve problems using letters, boxes, or symbols to represent another number Materials: Lucky Charms	Using Lucky Charms cereal to represent the unknown number, students will create an algebraic problem; e.g. 4 hearts + x = 7 hearts	Teacher will observe how problems are created and solved.
4.52 Identify patterns in multiplication table 4.53 Describe arithmetic patterns (multiplying by 0 = 0, multiplying by 1=) Materials: graph paper and colored markers	Students will make a times table and highlight patterns. Students will explain their patterns.	Teacher will observe the number of patterns and kinds of patterns.

<table>
<tr><th>Competencies</th><th>Activity</th><th>Authentic Assessment</th></tr>
<tr><td>NUMERATION
Place Value

5.1 Identify even and odd numbers

Materials: number lists or lines</td><td>Direct the students stand up for even numbers and clap for odd numbers. Have different students recite different pattern sequences of numbers; e.g. 0,5,10,15, … 1,2,3,… 2,4,… 1,3,5,… 0,3,6,9,…</td><td>Plan a party for 17 people. Divide this group into 2 teams. What is the result? Ask: "How would you solve this problem to make the teams even?" "Is it possible to make to make teams even for any number of people?"</td></tr>
<tr><td>5.2 Recognize, read and write place value to millions

Materials: Make a random list of numbers to 1 million; a large laminated chart like the model at the right, erasable marker</td><td>Mark the chart as below:
<table>
<tr><th colspan="3">Millions</th><th colspan="3">Thousands</th><th colspan="3">Ones</th></tr>
<tr><td>h</td><td>t</td><td>o</td><td>h</td><td>t</td><td>o</td><td>h</td><td>t</td><td>o</td></tr>
<tr><td>5</td><td>8</td><td>2</td><td>1</td><td>0</td><td>7</td><td>4</td><td>7</td><td>3</td></tr>
</table>

Write a number less than 1 million on the board, e.g. 582,107,473. Select 9 students and assign sequence. The first student says the ones place value (3). The second student says the number in the first two place values and their values 7 tens, 3 ones; or seventy plays three, or seventy-three). Continue through the whole number to the 9th student who identifies the expanded form for the whole number. e.g.
Five hundred million plus eighty million plus two million, …
Or
Five hundred eighty-two million, one hundred seven thousand, four hundred severty-three</td><td>Relate the year number to events:
2, 001 election of a new president
Find historical dates (years) or personal events for years, e.g., year they were born, members of the family, dates of important Native American events, e.g.
1,990
date of birth,
date first entered in Pow Wow
etc.

Student survey the newspaper for the largest number that can be found. Copy it and then state the place value of each number.

Check the USA 2000 population figure. Compare to the population of Winnebago.

What is the distance to the moon an back?</td></tr>
</table>

Competencies	Activity	Authentic Assessment
5.3 Recognize, read and write place value of decimals from the whole. Materials: cards with 10ths, 100s, tenths, hundreds, thousandths written on them. Card with numbers, e.g. 3.01; 4.234; 5.26 etc.	Review the number value position for whole number, i.e., ones are on the right, and number become **larger** as we read to the **left**. When working with decimals, e.g., 3.123 the ones place is to the **left** of the decimal point. The number value of the positions become **smaller** as we read to the **right** of the decimal point. Compare 3,123. to 3.123. <<< >>>	Direct the individual student to discuss the numbers after they have put it on the chart. Apply this knowledge to the real world, e.g. the store. Use a check register to record deposits and withdrawals. Student reads sales pages of newspaper. Copy a short list of items he/she would like to purchase. Add the list to find the total amount. Ask student to state the place value of each numeral, both whole and decimal numbers.
5.4 Interpret number line with whole numbers and decimals	Review decimals tenths, hundredths, to money as a correlate. Introduce thousandths. Discuss where 3 digit decimals are used. Give the students a set of decimal name cards and direct them to place the name card under the place values.	Make a grocery list with the student using a store ad. The student will put the cost of each item on a number line. Record amounts of rainfall/snow for a month. Put the amounts in decimals on a number line.

Competencies	Activity	Authentic Assessment
5.5 Separate numeral values through hundreds using expanded notation. 5.6 Separate numeral values through thousands using expanded notation Materials: sets of numbers to dictate	See 5.2 Give each group a set of numbers in regular and expanded form. Race to see who can write them the fastest in expanded notation or combine expanded notation to a numeral.	Keep check list of individual students as they compete in the game.
Integers 5.7 Recognize negative and positive signs for integers Materials: games that permit players to lose points	As players gain and lose points the scores will reflect positive and negative numbers. Players take turns keeping score.	In winter months, record and chart temperatures. Check Tiger Wood's golf score for under and over par in golf.
5.8 Identify integers on a number line.	Plot numbers from the scores in 5.7 on the number line.	Discuss the results of the illegal act of writing checks from accounts that do not have enough money in them.
5.9 Identify positive and negative numerals along the X and Y axis. 5.10 Plot points on X and Y axis using positive and negative integers. Materials: thermometers or TV weather report; graph paper or large chart	Make charts plotting information from 5.7.	

Roman Numerals 5.11 Identify Roman numeral values of I., X, V, X, L, C, D, and M.	Make acronym for each letter to memorize smallest to largest. Match Roman to Arabic numbers	Outlines for writing essays use Roman numerals. Written speeches are sometimes sorted this way.
5.12 Recognize place value uses for Roman numeral placement Materials: Different objects with Roman numerals written on each, clocks etc.	The student will determine the value of each numeral.	

Competencies	Activity	Authentic Assessment
5.13 Identify unlike fraction denominators.	Fraction cards: 2 pieces for ½, 3 pieces for 1/3, etc. Fraction Bingo.	
5.14 Recognize lowest common denominator	Flash cards matching fractions with the lowest term card.	Teacher observes students as they manipulate the cards.
5.15 Identify multiples for lowest common denominator	Sequence counting. Multiplication chart.	
5.16 Recognize the pattern of multiples	Fraction Bingo	
5.17 Break down numbers into factors Continued >>>>>	Greatest common factor: start with 2 numbers e.g. 32 and 60 Divide the larger number by the smaller number $32\ /\overline{60} = 1\ R\ 28$ $28\ /\overline{32} = 1\ R\ 4$ $4\ /\overline{28} = 7\ R\ 0$ Seven is the greatest common factor (GCF) Divide until reaching zero. GCF is solved by using the letters in reverse: 1) find all factors; 2) find the common factors; &3) find the greatest common factor.	Each pair of students have a deck of cards with 0-9 numbers written on them, One student places 4 cards on the desk for a total of 4 numbers, e.g. 1 5 7 3. Each partner secretly forms 2 two-digit numbers, e.g. one player may have written 17 & 53; the other may have written 13 & 75. Each player finds the GCF and then exchanges with partner to check. The game continues for the other partner dealing the 4 cards.

5.17 continued	Another method for students to find the common denominator is: e.g. Find factors 30, 60 (1,2,4 8,16,32) |----------------| |----------| Write 1 & 32 spread out, then try 2 if works, write factor, next try 3 if doesn't work, try next (4) continue until meet coming down 2 then done. Repeat for next number.	

Competencies	Activity	Authentic Assessment
5-18 Compute equivalent fractions using multiplication	Flash cards having fractions and 5 cards with equivalent fractions to match.	
Materials: flash cards with fraction and matching equivalents	Fraction Bingo	
28 index cards for each pair of students (see directions in activity column)	Each player needs 14 cards. On ½ of a card write a fraction that can be simplified – on another ½ of a card write the simplest form. Continue for all 28 cards. Play like dominoes by matching equivalent fractions.	Observe the students as they place their cards to match.

Competencies	Activity	Authentic Assessment
5.19 Compute equivalent fractions, reducing, lowest terms, and simplest form Materials: See recipe in Activity column Frying pan or Fry Baby	Below is a recipe for ¼ batch of **Indian Fry Bread**. Students have 3 different measuring cups: 1/8, ¼, & ½ cups. Make a chart or write a paragraph to show how he/she could use each one to make the fry bread. Actually make the fry bread. 1 cup flour ½ tsp. Salt 1 ½ Tab. Shortening ¼ to ½ cup water Oil or shortening for frying. Add shortening to dry ingredients. Blend. Add water to make a soft dough. Set 30 to 60 minutes. On a floured board or table top, roll the dough to ¼ inch thick. Cut in shapes and fry in 375 degree oil. Teacher supervision needed.	Have examples of oranges, pizza, etc. Answer questions as a class. Orally evaluated and observation when the students are working with oranges and pizza.

Competencies	Activity	Authentic Assessment
Rounding 5.20 Round numerals to the ten's and hundred's place value 5.21 Round numerals in all places of the thousand's value 5.22 Round numerals in all three places of the million's value Materials: Lists of number combinations to use for practice at the white board.	See 3.12 for lesson initiation. Move to hundreds place value. Use the same idea but that 5 is the middle point. E.g. 129 would be rounded down because 2 is less than 5. E.g. 863 is rounded up because 6 is more than 5. Millions still pivot on the 5 number.	Using a state map, find the population of towns near where you live or where you would like to visit. Round those distances to the nearest ten, hundred, thousands and million miles.
5.23 Recite the "leavers" and "changers" that determine the correct rounding procedure	Translate the rounding up or down into "leavers" and "changers." Have the students quiz each other.	

<table>
<tr><th>Competencies</th><th>Activity</th><th>Authentic Assessment</th></tr>
<tr>
<td>Decimals
5.24 Identify, read, and write decimal place values up to 10,000ths

Materials: A chart of place value; Good athletic stop watch.

Large copy of the box in Activity column</td>
<td>Write numbers under the place value chart and direct the students read them.
<table>
<tr><th>Th</th><th>Hd</th><th>Tn</th><th>One</th><th>*</th><th>T-th</th><th>H-th</th><th>To-th</th></tr>
<tr><td>3</td><td>4</td><td>5</td><td>9</td><td>.</td><td>1</td><td>5</td><td>6</td></tr>
</table>
Deal 7 cards to be placed in the box of choice until all boxes are filled. Pairs read to each other. They say "1 is in the tenths place. Its value is .100; the digit 5 is in the hundredths place. Its value is .05. Continue until all digits have been read.
Expanded form:
3000+400+50+9.1+.05+006</td>
<td>Time foot races using a digital sports clock on the track or in the gym. Measure to seconds. Order the times from lowest to fastest.

Figure a grocery bill to the nearest tenths.</td>
</tr>
<tr>
<td>Prime Numbers
5.25 Breakdown numerals using factorization into prime numbers

5.26 List prime numbers through 50.</td>
<td>Tell students to stand when the number is prime and sit when it is not. They will have to do this activity by deciding if the number is prime or not.

See activities for factor composites.(5.17)

Have the students then make a list of the prime numbers that they have found. Put them on a 100's chart.</td>
<td></td>
</tr>
</table>

Competencies	Activity	Authentic Assessment
GEOMETRY/MEASUREMENT **Shapes** 5.27 Identify geometric instruments such as the protractor and the compass 5.28 Construct geometric shapes (circle, square, triangle and rectangle) using varying dimensions	Let students explore with the compass and protractor to get used to the instruments. Have them design their own objects. Kind of a free for all. Then have the students work on making the objects. This is a definite hands-on activity. Let the students make designs of their own with the compass.	Study quilt patterns, particularly the Winnebago Star quilt. Use compass & protractor to draw own quilt patterns of squares, rectangles, and triangles on graph paper. Color patterns.
5.29 Identify polygon shapes Materials: geo-boards and rubber bands; (See *Math Their Way*)	Direct the students to make cards with the name of the shape and its properties on one side and a picture on the other side. Have them practice with a partner by showing them one side and state what is on the other side. Use 4 bands to make an open figure on the geo-board. Change 1 band to make polygons of 3, 4, 5, 6, and 8 sides.	Find polygon shapes in the environment and local community. e.g. checkerboards, baseball diamond, etc.

Competencies	Activity	Authentic Assessment
Angles 5.30 Distinguish between Acute, Obtuse and Right angles Materials: old magazines, scissors, paper, glue	Teach the little sayings below: Babies are "cute" (acute) "Ob"ese is big (obtuse) When you make a right turn, your arm forms an "L" (right) Find pictures that have the different kinds of angles. Paste them on the paper. Measure with a protractor, label the degrees of the angle & if it is acute, obtuse or right.	Display a clock and ask students to give as many times for each angle that they can in 6 minutes, 2 minutes, for each question: "What times do the hands form right angles?" "What times do the hands form acute angles?" "What times do the hands form obtuse angles?"
5.31 Manipulate a protractor for angle measurements 5.32 Measure angles of various sizes 5.33 Construct right, obtuse, and acute angles of various given sizes using a protractor	Ask students to construct a polygon with any number of sides as large as will fit on a sheet of paper. Have them measure the angles, add them and record their results on a class chart. Ask, "What did you learn?" .	Measure angles of doors, desks, and windows.
5.34 Manipulate a compass for geometric design. 5.35 Bisect given angles using a compass and protractor	Give the students angles and then let them bisect the angles with a protractor. Challenge them to find a way to bisect angles only using a compass, and straight edge.	

Competencies	Activity	Authentic Assessment
Geometric Measures 5.36 Identify fractional parts of a ruler to the 1/8th of an inch 5.37 Identify fractional parts of a yard	Have the students make rulers of their own and make the marks to show ¾th, ½, 1/4th, and 1/8th of an inch. Ask the students to explain what spaces the lines represent. Give actual rulers to the students and measure different objects such as the top of their desk, a cover of a textbook, etc. Next ask, "What part of a yard is an inch? 2 inches? 12 inches? …. Ask students, "What part of a yard is a foot? two feet? …. Give each student a yard stick to measure a sidewalk square, the height of a tree, and other objects outside of the room using yards and thirds of a yard or 36ths of a yard.	The students will then be assigned to measure specific things at home for their homework
5.38 Identify the formula for perimeter. 5.39 Calculate perimeter of given uniform shapes Materials: cone of string or a skein of yarn; rulers, yard sticks or carpenters tape measures	Ask how to find the perimeter (adding the measurements of all sides). Use string or yarn to "mark" the perimeter of the objects in the room. Direct the students to figure the perimeter of the marked objects. They need to check with the other students to see if their answers are similar. Have at least 5 or 6 objects for them to work with.	Compute the perimeter of the playground if it is enclosed with a fence, or where a fence could be placed..

Competencies	Activity	Authentic Assessment
5.40 Identify the formula for area 5.41 Calculate area of given uniform shape Materials: same objects as in 5.38 and 5.39	Ask how to find the area (L x W or count the squares) of a rectangle. Using the same objects in 5.38 and 5.39, compute the area of each using paper cut to the square foot. Lay the paper like tiles to show that it is surface.	Homework: measure and compute the area of their front (living) room. Compare area to perimeter on graph paper – draw squares and rectangles, count squares – compare to the number of units around the figure – actually count inside squares. (Some children may confuse perimeter and area. Observe their activities to determine clarity). Compute the area of the classroom. Find the cost to purchase carpeting for it.
5.42 Identify and locate radius, diameter and arc of a circle 5.43 Define line, ray and segment 5.44 Identify lines, rays, and segments of different lengths	Make and fill out cards to be kept on desk that shows a picture of and defines diameter, arc, and radius Construct circles, look for circles in room or outside, measure and identify the parts. See 4.23	Student uses own words to describe the difference between: radius, diameter, arc, rays, segments.
5.45 The students will identify and construct parallel lines.	Look at the word parallel. Parallel The two l's are parallel; They will never touch Find parallel lines throughout the room and then construct the lines.	Measure the distance between the walls in a hallway in several places. "How do construction workers use the technique of parallel lines? Shingles on the roof? Sidewalk forms?"

Competencies	Activity	Authentic Assessment
5.46 Identify and construct intersecting lines	Find various examples throughout the room and school. Construct these lines.	
5.47 Recognize the difference between horizontal and vertical lines.	Look at pictures of sunsets and sunrises on the horizon. Get children to talk about the horizon going across the sky. Horizon = Horizontal Measure students' "vertical" jump. Measure the students' broad jump. Compare to the height or vertical jump.	
5.48 Compare meter/yard, km/mile, and cm/in	Compare the distance between two objects in cm/in and m/yd. Go for a walk and compare the distance in m/yd/mi. Take a roll of toilet paper and have the students measure things by counting the amount of squares they use. Then compare that to many others things that you can use.	

Competencies	Activity	Authentic Assessment
5.49 Recognize lines of symmetry Materials: Sheets of paper with several different geometric shapes drawn on them; small rectangular mirrors (see *Math Their Way*)	Give students a piece of paper with different shapes drawn on it. Allow them to experiment by placing the mirror at certain places on the shapes to create a different configuration. Talk about the designs they have created. Give the students figures with lines of symmetry drawn on them. Have them put the mirror on these lines. They should discover that the mirror completes the picture. Give the students a variety of cutout shapes. Allow them to fold the shapes along what they believe to be lines of symmetry. If both sides match up exactly, these are lines of symmetry.	Students can demonstrate and orally explain to the class what symmetry is. Locate in daily written assignments. (mirrors or tracing and cutting out shapes may be utilized)
5.50 Identify congruent and similar shapes Materials: tangrams (See *Math Their Way)*	Construct different shapes (some of both) and then have them classify the shapes as congruent, similar or both..	Observation, watch the students to see how they are comparing and contrasting the different shapes. Orally have the students tell about the different objects. Have them construct their own.

Competencies	Activity	Authentic Assessment
Addition 5.51 Apply regrouping in addition problems up to 10,000. Materials: *Touch Math* *Mathematics … A Way of Thinking*	Teach *Touch Math* method of regrouping for students who need the motoric and visual approach. See *Mathematics … A Way of Thinking* for place value and regrouping activities pages 82-86.	Quiz over touch-points on the numbers 1-9. Students who do not automatically know their addition facts will use *Touch Math*. Teacher can watch to see that the students are grasping the concept of regrouping through the "Ding-Dong" Game.
Subtraction 5.52 Regroup in subtraction problems up to 10,000 Materials: flash card sets	Use a base ten to teach the basic idea of subtracting and borrowing. Use markers to show the borrowing process (See *Math Their Way, p. 112-113)*	Students will apply regrouping in base ten math assignments

Competencies	Activity	Authentic Assessment
Multiplication 5.53 Memorize multiplication fact 1 to 12.	Sequence counting. (See *Touch Math*)	Practice orally with a buddy.
Materials: multiplication fact flash card sets	Multiplication cards to practice the facts. Put the children in groups of two and have them practice by listing ways to remember the fact, e.g. 4x6=24 is double 6 two times: 6, 12, 24.	
5.54 Compute 2 digit multiplication problems with and without 0 as one of the factors.	Teach students how to take blood pulse count. Tell the students to record the amount of heartbeats that they find in a minute. Then have them multiply to see how many times that it beats in an hour, a day, a week, a month, and a year.	Record the information that you have obtained on a chart. Compare the differences among the students.
Division 5.55 Memorize division facts through 12. Materials: division flash card sets	Practice with division cards. Divide the class of students into groups of two and practice the facts.	Keep score of individual progress

Competencies	Activity	Authentic Assessment
Division 5.55 Memorize division facts through 12. 5.56 Calculate 2 digit division problems with remainders. 5.54 Calculate 2 digit division problems with remainders. Materials: counters; clear boxes to hold sorted counters	See 5.17 Write a number on the board. Ask the students to name the whole numbers that divide evenly into the number. Then list all of the numbers including one and the number itself. Put a pile of 42 counters on the table in the front of the class. Demonstrate the two types of problems that illustrate division: 1. How many counters can be put equally in 6 boxes? 2. If you put 6 counters in each box, how many boxes do you need? 3. Discuss the amount in each box and then change the number of counters and repeat the process. You will be able to do this with a remainder and without remainders.	Observation of the process to generate factors. Written work to see the process the students use.
Fractions 5.58 Add proper fractions in which one denominator changes into the other. 5.59 Add proper fractions in which both denominators change. Materials: cardboard replicas of fractions	Have cardboard fraction circles- wholes, halves, fourths, eighths. Ask the students to use the materials to answer your addition questions. After they have answered each question, write the equation on the chalkboard. What is one-fourth plus one-fourth? (2/4 or ½)	Teacher observation of what cards students chose and how they manipulate them or what fractions they say – reasoning used to get their sums.

Competencies	Activity	Authentic Assessment
5.60 Subtract proper fractions in which one denominator changes into the other. 5.61 Subtract proper fractions in which both denominators change. Materials: fraction replicas	Use the fraction pieces. Ask the students to use their pieces to answer subtraction problems. Write this on the chalkboard. ½ - ¼ = ________ What piece do you need to put out? (1/2) Can you take ¼ piece from ½ piece? Can you trade? ½ traded for 2/4 Making the problem now 2/4 –1/4 = ________ Use the materials for other subtraction problems, such as 7/8 – ½, ¾ - 1/8, ½ - 3/8.	Observation of the work and let them work with a partner to figure out other problems.
5.62 Transpose improper fractions into numerals.	Use fraction pieces. Ask the students to show 8/4 using the pieces. Ask if there is a simpler way to show this. Students should see the 8/4 is the same as 2 wholes. Ask the students to show 11/8 using the pieces. Ask them to find a simpler way to show this. Students should see that 11/8 is the same as 1 3/8. Continue by using different numbers.	Observation of the students

Competencies	Activity	Authentic Assessment
5.63 Multiply a whole number by a proper fraction	Tell the students some story problems. Ask them to act out the stories and explain their reasoning. 1. Six students are standing. 1/3 of them sit down. How many students sit down? (2) How many are still standing? (4) 2. Ramona is holding 8 books. Juan takes ¼ of the books. How many does Juan take? (2) How many is Ramona still holding? (6) 3. Sumi has $.12. She gives 1/3 of her money to Lee. How much does she give to Lee? (4) How much money does she still have?	Have the students split into groups of three or four. Have them make up a story problem for 1/3 of 12. Have them trade, read, discuss and solve.
5.64 Multiply two proper fractions.	Draw a square on the board. Ask the students to draw a line to divide the object in half and then divide the half into halve. Ask them to explain how this works. 1. Write ½ of ½ = ? on the board. Discuss with the students that their diagram shows ½ of ½ is ¼. Write the problem and answer on the board. 2. Repeat with thirds. Write 1/3 of 1/3 = 1/9 . 3. Repeat with other fractions.	Have the students perform operation through other problems.

Competencies	Activity	Authentic Assessment
5.65 Divide proper and improper fractions. Materials: an orange for each child	Have the student take oranges and divide into separate sections. The students will need to figure how many pieces that are ¼ of the orange they can get from ¾ of the orange. Write the equation ¾ divided by ¼. Solve. Have the students then explain the 7/8 divided by 1/8 words, pictures or models and actions.. Have the students create other problems to work with a partner or the class.	Have the students work with a partner and then have them trade with others to check.
Decimals 5.66 Multiply single and double digit decimals with whole numbers having 1 to 2 decimal places.	Have the students measure the length and width of their desk top, a bulletin board, drawing paper, floor, reading book, and math book. They need to measure to the nearest tenths. Then have the students figure the area of these objects. (L x W)	Put the information on a bulletin board.

Competencies	Activity	Authentic Assessment
PROBLEM SOLVING **Story Problems** 5.67 Recognize relevant information within a 2-step problem 5.68 Recognize relevant information within a 3-step problem Materials: See appendices for RIDD and Burger Problem Solving method.	Have the students create real-life story situations and then pass the problems to a partner and have the partner solve them.	Teacher observes the process either student us to create and solve the problems.
Algebraic Unknowns 5.69 Calculate the numerical value for an unknown/variable	Make up story problems with real life story problems. Such as: 1. "You have 3 pickles on your sandwich and there are 6 more in the jar." 2. "How many did you begin with?" N – 3 = 6 3. Have the students make up the problems that show unknowns.	
Estimation 5.70 Estimate relative distance between two points	Take the students outside and guess the amount of distance to the different points and then actually measure the distance.	Observation by watching the students Estimate and measure.
5.71 Compute averages in practical applications: grade, precipitation, weight, length	Keep the temperature for the week and also the amount of precipitation. Have the students chart the information and then find the average after a week. Have the students figure their own grades for a week in a certain subject	Oral evaluation can be used to check the student process.

Competencies	Activity	Authentic Assessment
Data Interpretation 5.72 Develop a Survey. 5.73 Create charts , graphs and tables from the survey. 5.75 Interpret information presented on a graph chart or table.	Have the students develop 5 questions about something that is an issue at the current time with the students. Have them ask the questions of several people to find the information. Take the information obtained to make the charts, graphs and tables to present the information. Have the students tell the class what they have learned and compare the information.	Written information of the charts and then the presentation of the information to the class.

Competency	Activity	Authentic Assessment
NUMERATION **Place Value** 6.1 – Identify, read and write numerals to billions. Resources: blackboard	Write a numeral in the billions on the board. The first student says the ones place value. The second student says the total value of the digits in the tens & ones places. E.g. …2,364, four, sixty-four, three hundred sixty-four, etc. This process continues until the billions place value is reached. Start again with another number	Teacher will observe the students to make sure they understand and give extra help to those that do not.
6.2 – Transpose a five and six digit numeral into expanded notation. Resources: blackboard	Each student makes a number up to 100,000. One student will write his/her number on the board and another student will write the number in expanded notation. e.g.: 86,972 = 80000 + 6000 + 900 + 70 + 2 Each student will have a turn writing his/her number on the board and writing another one in expanded notation and having other students write its numeric equivalent.	Students will be assessed on their ability to write numbers in expanded notation.
6.3 – Identify exponential form. Resources: cards with expanded notation and standard numerals 6.4 – Transpose the expanded notation of five and six digit numerals into exponential form. Resources: prepared questions on exponential form.	Students will play "Around The World" identifying the standard numeral for the expanded notation or identifying the expanded notation for the standard numeral.	Students will orally say the exponential form or the standard numeral. Students will be able to write expanded notation independently. "Can the classroom score be raisedd today?"

Competency	Activity	Authentic Assessment
Roman Numerals 6.5 – Identify, read and write Roman numeral values Resources: blank sheets of paper Resources: toothpicks	Assign the students a partner. Each student writes a Roman numeral on a slip of paper up to 100. The students then exchange slips. Each student makes a sequence of three Roman numerals by writing the Roman numerals for one less and one more than the given number. The students also write the standard numeral for the given Roman numeral. Give each student 20 toothpicks. Tell the students to use exactly 10 toothpicks to make a Roman numeral equation. Have them record it on a piece of paper. E.g. V + I + VI (10 sticks) and X + I + XI (10 sticks) Use the toothpicks to make other equations.	Students will read and write Roman numerals. "Where will you find Roman numerals in real life?" (dates, time, on movie credits, outline section numbers, etc.) Students will be able to create the Roman numerals with toothpicks.
Rounding 6.6 – Rounds numbers to billions Resources: paper	With a partner, each student will write a number to the billions place, 10-digits. Each student will, in random, ask his/her partner to round the number to each place one-billion, although in random order.	Teacher will observe the students as they are working in groups to make sure they understand.

<table>
<tr><th>Competency</th><th>Activity</th><th>Authentic Assessment</th></tr>
<tr><td>6.7 Round decimals to the tenths place.
6.8 Round decimals to the hundredths place
6.9 – Rounds decimals to thousandths place.

Resources: note cards with decimals numbers</td><td>Assign the class members to one of two teams. Alternately, each team will be given a number to round a decimal to tenths, hundredths, or thousandths place. Team points are given. No student is asked to sit down if s/he does not know the correct response.</td><td>Teacher will observe the students for rounding.</td></tr>
<tr><td>Fractions
6.10 – Reduces fractions to lowest terms.

Resources: two sets of boxes with 1/2, 1/3, 1/4, 1/5, and 1/6 labeled on them. Also, every student needs four cards with equivalent fractions.</td><td>Assign the students one of two teams. Each team will have boxes with 1/2, 1/3, 1/4, 1/5, and 1/6 on it. Each person will have four cards with equivalent fractions on it (e.g. 5/10). The first person from each team sorts his/her cards into the appropriate box. As soon as the first person returns to the line, the next person may sort his/her cards into the appropriate box. The team that finishes with the most cards in the correct box wins.</td><td>Teacher will observe the students' ability to reduce fractions to lowest terms.</td></tr>
<tr><td>6.11 Change fractions to decimals to percent to the reverse
and
6.16 Changes fractions to decimals and percent and the reverse.

Resources: chart on the board</td><td>Draw a chart on the board with rows for fractions, decimals and percent. E.g.
<table>
<tr><td>fraction</td><td>decimal</td><td>percent</td></tr>
<tr><td>½</td><td>.50</td><td>50%</td></tr>
<tr><td></td><td>.75</td><td></td></tr>
</table>
Ask students to fill in one example and explain how to change fractions to decimals and percent. Continue to add numbers.</td><td>Teachers will observe how student change numbers from fractions to percent and decimals.</td></tr>
</table>

Competency	Activity	Authentic Assessment
6.12 – Identify the multiples of given numerals. Resources: none	Direct the students to sit in a circle. The teacher calls a number from 1-10 to represent the multiple. The student count from 1 to 40 in turn. Each time a multiple of a number the teacher called, the student who called that number stands until the next multiple is called.	Teacher observes how student identify multiples.
6.13 – Recognize factor breakdown from given numerals. Resources: none	Direct the students to sit in a circle. The teacher calls a number from 1-50 represent the number to be factored. The students start with the number 1 and calls all the numbers up to 50 in turn. Each time a factor is said, the student calling that factor leaves the circle. Continue until the circle is depleted. Start with a new full circle again.	Teachers observe how students count after the number to be factored (selected by the teacher) has been reached.
6.14 – Identifies, read and writes decimal place values up to millionths. Resources: charts with place values from millions to millionths	Direct the students to create a chart with the place values from millions to millionths. Tell the students to put a certain number in each place value. (E.g. put a 3 in the ones place, 7 in the thousandths place.) Have the students individually read the number. Then have the students create their own chart to share in small groups. One person will call out where to put the number and the other students will put the number in the appropriate box.	Students will read the numbers.

Competency	Activity	Authentic Assessment
6.15 – Recognize the meaning of percent. Resources: quiz on addition and subtraction	Give the students a 10 question quiz on addition and subtraction. Have the students correct their quizzes and put the answer in a fraction at the top of the page. Then ask the students what percent they had correct on their quiz.	Observe how students figure the percentage for a quiz and will say the percent.
6.16 Compare percent to fractions and decimals	See 6.11	
Prime Numbers 6.17 – Define prime numbers and list examples through 50. Resources: none.	Direct the students to stand in a circle. Tell students to take turns saying the numbers from 1-50, and when a student calls a prime number, he/she sits down.	Observe if students sit without a prompt.
6.18 – Factor given whole numbers into prime number simplification form. Resources: various materials to make mobiles – coat hangers, string, elastic bands etc…	Direct the students to create mobiles with prime factorization. Have the students put the number to be factored at the top. e.g., 12 2 6 2 3 Hang the factor tree mobiles around the room.	Students create their prime factorization for their mobile.

Competency	Activity	Authentic Assessment
GEOMETRY/MEASUREMENT **Shapes** 6.19 – Identifies geometric 3-D shapes (circle, square, triangle, & rectangle) Resources: various geometric shapes	Students will list 5 examples from life for each 3-D geometric shape. Share with the class by making a class chart of the forms.	Observe how students create their lists.
6.20 – Identify specific polygon shapes Resources: note cards	Students, in pairs, will draw polygon shapes on cards. Students then put the names and characteristics of each shape on other cards. Students turn all the cards over and play "Memory," matching the polygon shapes with their characteristics or characteristics with shapes..	Observe the students' depth and accuracy of characteristics on the cards and how student play the match game.
6.21 – Design a floor using five basic geometric shapes. Resources: graph paper, rulers, protractors	Students will create floor plan of a house on graph paper, incorporating five geometric shapes.	Observe the students five geometric shapes in their floor plan.
Angles 6.22 Label the geometric angles within their floor plans 6.23 – Labels and measures geometric angles. Resources: house plans, protractors	Students are given a house plan and are instructed to label 20 angles inside the house, by degree and the type of angle. Most angles will be 90 degrees.	Observe how students measure and label angles.

Competency	Activity	Authentic Assessment
Geometric Measures 6.24 Calculate the area for non-uniform shapes 6.28 – Calculates area of various circles using a formula Materials: rulers	Students will be asked to calculate the area for surfaces of various objects in the room or around the school, e.g., a textbook, football field, pop cans tops etc. Ask student, "Why they should know how to find area?"	Teacher will observe students as they calculate the area of various objects. Observe students reasons for knowing how to compute area.
6.25 – Calculates the perimeter. Resources: house plans, meter sticks	Students will calculate the perimeter of a house plan and the perimeter of the rooms inside the house. The students will also, as homework, measure the perimeter of a room in their house. Compare the perimeter and area in items in 6.24 and 6.28. Ask student, "Why they should know how to find perimeter?"	Students will calculate measurements and find the perimeter. Observe students reasons for knowing how to compute perimeter.
6.26, Measure the diameter of a circle 6.27 – Measure the radius of a circle. Resources: chalk, carpenters tape measures, yard and meter sticks	In a large area of the room, or outside, draw a large circle with chalk. Ask the students to measure the diameter and radius. Then have the students draw their own circles and measure the diameter and radius of their own circle with meter sticks. Have the students measure every other students' circles to find the diameter and radius.	Teacher will observe the students as they measure the diameter and radius.
6.28 – Calculates the area of a circle.	See competency 6.24	See competency 6.24

Competency	Activity	Authentic Assessment
6.29 – Construct figures using lines, rays and segments	Direct the students to create their own figures using at least 5 lines, 5 rays and 5 segments.	Observe how students create their own figures or identify lines, rays, & line segments in others.
6.30 – Calculate volume of given objects. Resources: various household items	Direct the students to measure the volume of various household objects such as a milk container, a pop can, a water bottle, a soup can, etc.	Observe how students will be able to measure the volume of any given object. "Why do we need to know how to compute and use volume?"
Thermometer 6.31 – Distinguish between Celsius and Fahrenheit on a thermometer. Resources: containers of liquid, Celsius and Fahrenheit thermometers	Students will have 4 containers with different temperatures of tap water in them. The students will measure the temperature of each container, in both Celsius and Fahrenheit.	Teacher will observe the students as they measure the temperatures.
6.32 – Identify freezing point and boiling point in Celsius and Fahrenheit Resources: heat source, freezer, thermometer	Assist the students to heat water over a heat source. Ask them to measure the temperature in Celsius and Fahrenheit of water & ice in the containers. Ask them to put more ice in and measure the temperature. Put the container on the heat source & record the temperature in C & F each minute until two minutes after it boils.	Observe how students identify the boiling point and freezing point of water in both Celsius and Fahrenheit.

Competency	Activity	Authentic Assessment
OPERATIONS **Addition** 6.33 – Add numbers with regrouping to one hundred thousands. Resources: 2 dice per pair; ones, tens and hundreds cards.	Racing for a Hundred is played in pairs. The players take turns rolling the dice. The dice tell the player how many ones to take. Whenever players have ten or more ones, they must regroup 10 ones for 1 ten; 10 tens regroup for a hundred. The first player to regroup for the hundred is the winner.	Observe how students regroup by exchanging cards.
Subtraction 6.34 – Subtract numbers with regrouping up to one hundred thousands Resources: 2 sets of digit cards 0-9	In pairs, students create two numbers to be subtracted. The students take turns drawing a card from the pile and placing it anywhere from the ones to the hundred thousands place, until all the place values are filled. Next have students generate another number with places from one to ten-thousands. Ask them to subtract.	Observe how students subtract any number given to them.
Multiplication 6.35 – Memorize multiplication facts through 12 Resources: Multiplication flash cards 1-12.	Students will play "Around the World" using multiplication flash cards. See 5.53 also.	Observe how students say any multiplication facts from 1-12
Division 6.37 – Memorize division facts through 12. Resources: division flash cards 1-12.	Students will play "Around the World" using division flash cards.	Observe how students say any division facts from 1-12.

Competency	Activity	Authentic Assessment
6.38 – Recognize the terms divisor and dividend. Resources: Each student will need cards with divisor and dividend written on it.	Direct each student to create a card with a divisor on one side and dividend on the other side. Write a division problem on the board. Have the students find the answer. (E.g. 15/3 =5). Ask the students to show either the divisor or the dividend side of the card for the number that you point to. Point to the 3. The students should hold up the divisor side of the card. Then point to the 15. The students should then hold up the dividend side of the card.	Observe how students show a card when asked to identify a dividend or a divisor.
6.39 – Calculate 3 digit division problems with and without remainders. Resources: dice	Give the students a 6-digit number to use as their dividend. Have the students roll 3 dice to create their divisor. Then have the students complete the division problem.	Observe how students compute any 3-digit division problem.
Fractions 6.40 – Add mixed and improper fractions. Resources: fraction cut-outs	Give the students pieces to represent fractions. Ask the students to add 2/4 and 1/4. Have the students find the correct pieces and add them together. For mixed numbers, include a whole number. For example, have the students add 2 ¾ and 1 ¼. Ask the students how many whole objects they have and how many pieces left. Note: fractions presented by circles (pizza or pie) are more difficult than squares or rectangles.	Teacher will observe how the students add their pieces.

Competency	Activity	Authentic Assessment
6.41 Subtract mixed and improper fractions Resources: rulers for each student	Direct the students to measure 10 inches with a ruler on a piece of paper. They only need to mark the lines at each end of the 10 inches. Ask the students to take away 1 ¼". The students must then measure 1 ¼ inches from one end of the 10 inches. How much is left? Continue with other fractions, mixed and improper until 10 inches is used. Ask the students to complete the following equations: 10 ….. = 0	Teacher observe how the students measure and complete the equation.
6.42 – Multiply mixed and improper fractions. Resources: recipes that the students brought in.	Give each student a copy of the recipes they brought in. Have the students find out how much of each ingredient would be needed to double or triple the recipe. If there is time, have the students make one of the recipes, making enough for the entire class.	Students multiply to find the amount for each ingredient of a recipe when making the class "goody."
6.43– Divide mixed and improper fractions. Resources: recipes that the students brought in.	Give each student a copy of the recipes they brought in. Have the students find out how much of each ingredient would be needed to cut the recipe in half and in thirds. Have the students make some of the recipes, only making half of the required amount.	Observe how students ingredients of a recipe. Compare the amount of the out-put in 6.42 when division occurs.
Decimals 6.44 – Divide three digit decimals into whole numbers. Resources: newspapers	Have the students check the winning percentages for teams listed in the newspaper. The percentage is found by dividing the number of games won by the total number of games played and rounding to the nearest thousandth.	Teacher will observe how the students compute the winning percentages of sports teams.

Competency	Activity	Authentic Assessment
Integers 6.45, – Add and subtract positive integers. Resources: bulletin board, push pins, integer cards	Students can play Integer Concentration. Hang 20 integer cards (e.g. 2- -4, 4+-2, 2+-4, --2, +-2, -2, 2) on a bulletin board with the back of the cards facing outward. The first player turns over 2 cards. If they have the same value, the player keeps the cards and goes again. If they do not have the same value, the player turns both cards back so no one can see the integers. The players take turns until all the cards have been matched.	Teacher will observe how match the cards..
6.46 – Add two negative numbers. Resources: bulletin board, push pins, negative integer cards	Create a number line with –20 to 20. Put a push-pin at each point. Have the students make playing pieces with strips of paper. Create cards with negative integers and put them in an envelope. Have the students pull out two cards and move their marker to the appropriate spot. Place the strips to add the two negative intergers.	Teacher observes moving their markers.
6.47 – Add positive and negative numerals. Resources: red and black checkers	Give the students red and black checkers. Have the red checkers stand for positive numerals and the black checkers stand for negative numerals. Give the students examples such as +3 - +4. Have the students figure out the problem using the checkers.	Observe how student solve the problems.

Competency	Activity	Authentic Assessment
6.48 – Subtract integers with one positive and one negative number. Resources: paper, red and black checkers.	Play integer shuffleboard. Make a shuffleboard playing field on a large sheet of paper and tape it to a table. Have the students slide red and black checkers at the target and then tally the scores by subtracting the integers in the sections where their markers are. Make sure the sections have positive and negative values so the students have to subtract both positive and negative numbers.	Teacher observes how the students add and subract.
PROBLEM SOLVING **Story Problems** 6.49 – Construct a three-step story problem.	Teacher will model an example of a three-step story problem. Students will, in groups, create their own 3-step story-problem with items in the classroom that they will present to the rest of the class. Note: See instructions for the RIDD strategy in the appendix.	Teacher observes how students create a three-step story problem and present it to the rest of the class.
6.50 and 6.51 Write addition, subtraction, multiplication, and division sentences Resources: various classroom materials in varying amounts	Students will be given random classroom items such as pencils, textbooks, rulers, and bottles of glue. From these items they must write an addition, subtraction, multiplication, and division sentence.	Teacher observes students using their items to create the required sentences.

Competency	Activity	Authentic Assessment
Algebraic Unknowns 6.52 Find the values of an unknown/variable Resources: various grocery and household empty containers	Direct students to bring in food containers such as cereal boxes, soup cans and milk containers. Direct the students to price their food items as whole numbers. Have students write problems as equations and exchange with a partner. Partners can select one to share with the class.	Teacher observes how students create their equation and solve their partner's problems.
Estimation 6.53 Estimate the depth of relative places and objects Resources: Playground equipment; carpenters tape measures	Take the students to the playground and have them, in groups, estimate various depths, such as from the top of the stairs to the bottom and from the top of the slide to the bottom. The students must first estimate the depth, then actually measure the depth.	Observe how students find the class average for each skill.
Data Analysis 6.54 Compute averages of traditional skills in the community Resources: community members and/or family members	Students will have family members answer a questionnaire about what Native American skills they can do. E.g. quilt, dance at pow wow, tell legends, etc. Students will bring the questionnaires back and the class will compute the averages for the skills and find out which skill has the highest average.	Students will see how many members of their family can do particular skills.

Competency	Activity	Authentic Assessment
6.55 – Read and interpret tables, charts, and graphs Resources: graph paper, rulers	Students will create a class graph of their foot sizes. They will graph how many students have certain sizes. From this graph they will answer questions such as How many people have the largest foot size? What size is the most common?	Teachers observe how students create their own graph and answer questions based on it.
6.56 – Conduct experiments to demonstrate an understanding of probability. Resources: 2 bags of M & Ms for each group, graph paper.	Give the students, in groups of 3 or 4, 2 bags of M & Ms. Tell them to open one bag and write how many M & Ms there are for each color. Have the students open the second bag of M & Ms and repeat the procedure. Have the students graph the information. Then have the groups compare their information by giving the M & M color with the highest count and the M & M color with the least count. Direct the students to compute the percentages for each color occurring in their bags.	Teacher observe how students will figure the probability of receiving a certain color M & M in their bag.

Read

A Learning Strategy For Creating Strategic Learners

Imagine

Decide

Do

Fay B. Jackson, Ed.D

Dear Teachers,

The RIDD strategy is one that has been researched in both elementary and secondary settings. It has been used in both general and special education settings. Students have increased grades and teachers have found that it is easy to incorporate into their daily curricula.

This booklet should act as a guide for you. The scripting is there only as suggestions, not as a requirement. The steps of the strategy do need to be followed and the concepts need to be stressed; however, you may modify the wording to suit your specific situation.

You may reproduce the RIDD strategy or any part of if as you need wish. The purpose of this is so it can be used with ease.

I believe you will find that when students begin to use the RIDD strategy, you will see an increase in learning and motivation. Further, you may find that using other strategies in your classroom will be less threatening.

Included in this booklet are the lessons of RIDD, a learner helper form and a certificate you can distribute at the conclusion of the lessons. Creating strategic thinkers should be one of the goals of education. I hope you will find this strategy useful in that quest.

Jay [illegible]

Lesson 1 Introduction to **Read**, **Imagine**, **Decide**, and **Do**

Teacher:

Today, we are going to start discovering a new way to learn. It is called Read, Imagine, Decide and Do. We will call it RIDD for short. This strategy has been used by a lot of students in the seventh through the twelfth grade. Some students used it and increased their math scores by a whole letter grade. Some students used to pass state exit exams. Still others have used it to improve their performance in classes like English, science, and social studies. Have you ever been in some class where you wanted to really do better?

Teacher encourages students to list classes that have presented a particular problem.

Each of those times you talked about could be helped by RIDD.

Now, before we start this, I want each of you to realize that our minds are VERY fast. When I first start explaining this, you may think that it is too much work, but remember, I am showing you a new way to think, not a new way to use language. For instance, if I say, "I want each of you to picture the cafeteria in our school", you already have a mental picture of what it is like. However, if you told me everything you pictured we would be here for a long time because you would have to change the picture into language. Well, this works just in the opposite direction. I am starting with language and then you will change it into a mental picture. Let's try something like that. I want one of you to tell me everything you just pictured about the cafeteria. **(Allow one student to talk for no more than thirty seconds).** Wow, you have been talking for a while, and now think of the things you left out. **Teacher mentions obvious things that were not discussed such as how tables are placed and how many are in each row. Also emphasize color and the place the food is served in relationship to the room if those things were not mentioned**. You see how fast your minds are?

We will start RIDD by looking at each step in the process. First the **R** step. The **R** means Read from the first capital to the last end mark without stopping. This is really important in reading instructions for completing some of the exercises you have in text books and workbooks. Before you start reading, you need to decide what you will call words you don't know. Remember, it is important that you read each sentence without stopping. Some people use the words *whatever* or *big word.* When good readers are finished reading, they can usually go back and figure out what the word was by the other words around it, or what we call context.

The next step **I.** That means Imagine. In this step, you can make a quick mental picture of what the text is about or maybe you will imagine what your paper will look like when it is finished. This step is here to help you focus on the thing you need to do. It will also help you to9 know if you understand what you read. If understand what you have read. If you cannot get a mental picture, there are some things you can do. You can read it again, read it aloud, ask for help, look up a word or get someone else to read it aloud to you. Remember, everyone needs help every once in a while. You will not always want to depend on someone else, but sometimes, that is the best thing to do.

In this step, the picture you make in your mind is yours. Sometimes you may want to imagine what some character in a story would look like, or you may want to make something funny. You can imagine what your paper will look like when you are finished working. Sometimes we will share the pictures you imagine, but most of the time we will not because these are really your own ideas and no one else's.

Now let's look at the first **D** that stands for decide. During this step, you may look again at the main words in the directions to see what you have to do. If you are reading something like social studies or science, this is when you decide if you understood what you read and make a decision whether you go on to the next passage or if you need to do one of the things we talked about earlier like going back, reading aloud, looking up a word, or asking for help. If you are working on a math word problem, you may decide if you need to add, subtract, multiply or divide and in what order you will do those things.

The last step, **D** is or do the work. This is the only step in which you do something that someone else can actually see. All of the rest are things that you are thinking, so other people cannot see what you are doing. The other steps are the things that make this strategy special. Because the steps are done in your mind, all of the thinking is yours and yours alone. In this step, you write the answer, read the next passage, or perhaps start to actually do the exercise you are doing. When you finish this step, you go back and see if you did what you decided. If you did not, try to figure out why. Most of the time, you'll find out that because you did such good thinking before, the two steps match very well.

Now let's say the steps of RIDD. I'll say them first and you say them after me.

Teacher R Read from the first capital to the last end mark without stopping.

Students: **R Read from the first capital to the last end mark without stopping.**

Teacher: I Imagine what you need to do or imagine what is happening in the passage.

Students: **I Imagine what you need to do or imagine what is happening in the passage.**

Teacher: D Decide what to do.

Students: **D Decide what to do.**

Teacher: D Do the work.

Students: **D Do the work.**

Teacher: Good! Now say the steps as I point to them on the board (Or overhead).

Students:

R Read from the first capital to the last end mark without stopping.

I Imagine what you need to do or imagine what is happening in the passage

D Decide what to do.

D Do the work.

Very nice. Now we will go on with our regular work, but I want you to try to use RIDD in some of the things you do, mainly in reading directions. Tomorrow, we will look at some of the ways you used RIDD today and start really applying it to some things that can help you. I will use RIDD in all of the instruction we have today, so you can see how it works.

Lesson 2

Teacher: Yesterday, we looked a little bit at the RIDD strategy. Let's review. First, let's go over the steps. I'll say them first and you say them after me.

Teacher: R Read from the first capital to the last end mark without stopping.

Students: **R Read from the first capital to the last end mark without stopping.**

Teacher: I Imagine what you need to do or imagine what is happening in the passage.

Students: **I Imagine what you need to do or imagine what is happening in the passage.**

Teacher: D Decide what to do.

Students: **D Decide what to do.**

Teacher: D Do the work.

Students: **D Do the work.**

Teacher: Good! Now say the steps as I point to them on the board (Or overhead).

Students:

R Read from the first capital to the last end mark without stopping.

I Imagine what you need to do or imagine what is happening in the passage.

D Decide what to do.

D Do the work.

You did a good job saying the steps. Now, Let's see if you can say them by yourselves with no help from me at all.

Students: Repeat steps. Teacher calls on each student to say each step individually before continuing. The teacher corrects steps immediately if necessary. Be sure each student can say the steps correctly.

Teacher: That was good. Now, let's look at a way RIDD can help you in your school work.

One thing that all assignments have in common is directions. Sometimes, we lose points on a test or on an assignment because we don't always read all of the directions. Often, we stop at the end of the line rather than the end of the sentence. Let's look at a book that has directions in it and see how we could do better if we read *all* of the directions, not just to the end of the line. Can you think of a time when you have missed points because you did not read all of the instructions? (Wait for responses. Prompt students with "Do you always read ALL of the instructions to a test? Have you ever lost points because you did not do everything?)

Sometimes, people have lost time when they had to go back and read directions again because they did not really read them the first time. Now, let's see how this works.

Teacher picks a text that the students are using and reads the first line of directions to an exercise that has at least two lines of instructions. English grammar books are often useful in this area as math books that

require students to use more than one operation to complete the problem. OK, each of you look at these directions. Ok, now, before you answer my questions, I want you to read all of the directions from the first capital to the last end mark. Would you always read all of the directions? What would you have missed if you had not read everything? **Teacher waits for responses.**

OK now, lets use the Imagine step. Get a mental picture of what your paper will look like when you are finished. Will you just have a list of words? Will you have sentences written out? Will there be some things circled or underlined? If you imagine these things, you will be able to focus more of your attention on what you are supposed to do than if you just jump in and start to do the exercise. You can use the imagine step when you are reading sentences in English, or when you are reading something that is longer. This may be the most important step because this is when you are doing your real thinking. What kinds of things did you see after you read these instructions? **Teacher waits for responses and calls on several different students.**

Now for the Decide step. Here is when we actually decide what to do. Now you look over the instructions again and look for the key words like choose, underline, circle, or write. Notice, that you haven't really done anything yet, all of this has been thinking. Tell me what you would decide to do in this exercise. **The teacher waits for responses and calls on several students.**

The last step is Do. This is when you actually do what you decided. Now, I will use RIDD on an exercise so you can see how it works. I will have to use language and talk aloud, but when I am really using it, I won't have to be that slow. **The teacher reads the instructions of another exercise and goes through the steps of RIDD.**

Alright now, lets do one together. **The teacher picks out one exercise. Teacher asks ,** "What is the first step of RIDD?" Students say, Read from the first capital to the last end mark without stopping. OK who will do that for us? **Student reads all of the directions.** After directions are read, ask students to imagine what their papers will look like. **Wait for responses.** OK good, you are making a mental picture of what your paper will look like. Do you realize how fast that was? Now let's go to the Decide step. Someone tell me what we do in the Decide step. **Call on a student and let him or her explain that this is when you decide exactly what to do by looking over the directions again.** Very nice, now let's do the exercise. **The teacher does the exercise on the board or overhead as students complete it.** That was good. Now tomorrow, we will look at other ways to use RIDD.

Lesson 3

Teacher Yesterday, we learned how to use RIDD with directions. You can use it the same way for test questions as well. Today, we are going to use RIDD in another subject. We will use it with social studies (**any subject the teacher chooses will be appropriate**). Let's pick a chapter from the social studies book and read the first paragraph. I will read it aloud to start with. Remember, I will read this paragraph from the first capital to the last end mark *without stopping*. I have already decided what word I will use if I come across a word I don't know. I have decided to use "something" in place of the word. **The teacher reads the first paragraph of the chapter.** I have read from the first capital to the last end mark, and I am going to imagine what is happening. **The teacher tells about the mental picture he or she created when reading the passage.** Now I have to decide what to do. I did understand all that I read, so I will go on to the next paragraph. The doing part of this is simply going on to the next part and repeating the process. One of you read a paragraph for me and you use RIDD, just like I did. **The teacher listens to the reading. Any corrections in the use of the RIDD steps should be made immediately.** Good. You read the paragraph from the first capital to the last end mark without stopping, then you shared your mental picture, or what you imagined. You decided what to do, and now you can do what you decided. **Each student who wishes can read aloud and demonstrate RIDD.**

That is really good. Now, it is just time to practice using RIDD in a lot of different subjects. I will give you a form to fill out whenever you use RIDD. This is something you will need to do for a while until you can use it without being reminded of the steps. We will do this for two or three weeks, and every day, you can tell me how you've used RIDD. Finally, when you are using it all by yourselves, with no help at all, you will be on your way to being really good thinkers.

Lesson 4

Teacher I need to see your forms and we will talk about them. Remember, you will not always have these forms, but I have to be sure you do understand how to use this.

Teacher allows each student to tell when and where RIDD was used during the previous day. That's good. You are really coming along nicely.

(Lesson 4 will be repeated until all the students are using RIDD correctly.)

Lesson 5

Teacher For the last few days, you have been using RIDD in your academic work. You have been doing well with it. Tell me some of the things you have done better since you have been using RIDD. **Teacher encourages responses.** Do you remember when we first started using the strategy? I know you all thought it was too long, but now, you are using it very quickly. You have been able to change it from language to a thinking process. Good for you! Now, I have something for all of you who have used RIDD. **Teacher gives out certificates.**

Read, Imagine, Decide, and Do

_________________________________ has

completed instruction in the Read, Imagine, Decide, and Do strategy and is therefore considered to be a strategic thinker.

______________________________ ______________

Teacher Date

Read, Imagine, Decide and Do (RIDD) Learning Helper Form

Check all of the things you did when you used RIDD.

○ **I read from the 1st Capital to the last end mark.**

○ **I imagined and got a mental picture.**

(Write down what you imagined. Remember, spelling and writing are not as important as thinking)

○ **I decided what to do.**

(Write down what you decided to do and why)

○ **I did do the work.**

Jackson, 1996

Teaching Word Problem Solving:
Burger's Method

Not all students necessarily have difficulty with number concepts; however, solving word problems is often a difficult area. Problem solving is considered a basic skill in teaching mathematics, particularly, real-life situations in teaching problem-solving. It is more meaningful to the students and it facilitates their learning to solve problems independently. According to NCTM, the goal of mathematics programs is to give students experience in the application of mathematics, which involves selecting and matching strategies to the situation at hand.

NCTM recommends the following:

1. The mathematics curriculum should be organized around problem solving;
2. Appropriate curricular materials to teach problem solving should be developed for all grade levels.
3. Mathematics teachers should create classroom environments in which problem solving can flourish.

The difficulty with word problems is not fundamentally a problem of reading. It is a problem of imagination, of visualization, of the re-creating mentally of the elements of real situations. Most students are able to read the words in a story problem; however, visualizing the intended actions appears to be a very difficult task.

Burger found that it was advantageous present mathematical problems at the level the student was presently functioning. The use of the CBA data will assist the teacher to determine at what level the student is currently mastering.

Burger's 2nd step is to present information on problem solving to the students:

(a) the definition for the term "facts" should be presented, discussed, and mastered;

Math word problems are composed of **facts.**

A fact is something that is true. Facts can be told with pictures and with words.

Repeat the definition with the students until they can say it independently.

Present examples; ask students to point to and say the facts in the word problems.

Make it know to the students that facts are presented in a word problem before the question is stated.

(b) The definition of the term "question" is presented.

Every word problem asks a **question**.

Students should state the definition of question.

To find the answer to the question, I use the facts in the word problems.

Present examples; ask students to point to and say the questions in the word problems.

(c) Present more examples of word problems.

Ask the students to say both the facts and the questions.

(d) Before trying to answer a word problem, the students are instructed to look for "action words."

Action words help to understand the problem and decide what to do to find the answer.

Action words are located in the facts. Ex: Mr. Becker *sold* 8 dozen eggs.

Present examples of story problems; ask students to say the action word/s.

(e) The term "key words" is presented.

Key words are often clues to solving word problems.

Key words are usually found in the question part of the word problem.

Present examples; locate "key words" in the questions, i.e. addition, subtraction, multiplication, or division.

Students list the "key words" in each of the basic computation areas.

[See diagrams at the end of this material]

(f) Ask the students to state the definitions for each term and give an example of each one.

Make a poster-board chart with the following information:

Problem Solver's Checklist

1. Read the problem carefully.
2. Draw 1 line under the question.
3. Circle key and action words.
4. Draw 2 lines under the facts.
5. State the problem in your won words or draw of picture of it.
6. Decide if you will +, -, x, or ./.
7. Solve the problem and check your answer.

Present some story problems **without** pictures. Ask the students to try to solve them.

Then present more story problems **with** pictures [or ask the children to draw pictures of the story problem.

Discuss the difference between solving with and without pictures.

Example for the Teacher:

Tim had 3 toy planes on his shelf. He built 1 more toy plane.

How many toy planes does Time have in all?

[Draw two lines under the facts. Draw one line under the question.]

Ask the students these questions:

Are these facts?	Tim had 5 toy planes on his shelf.	NO
	Tim had 3 toy planes on his shelf.	YES
	Tim built 1 more toy plane.	YES

Make a poster-board for addition, one for subtraction, etc. key words.

Example for addition:

Addition

Add

Sum

Plus

Both

How many?

altogether

total

in all

how much?

As students go through procedure described in the first part of this manual, write the Key Words as they identify them with your example problems.

When you make the chart of Key Words for subtraction, you could wuse the following words:

take away

difference

How many fewer?

How much more?

minus

How many more?

How much less?

...Were left?

subtract

Make similar charts for multiplication and divison.

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Resources

Abacus from School Speciality
Cash register from Lakeshore
Calculators from Lakeshore
Checkers from Wal-mart
Deck of cards donated by WinnaVegas
Dream Catcher
Fraction Flashcards from Instructional Fair
Flip chute (curriculum office)
Fraction bingo game from School Speciality
Fraction Sets- circles and bars- from School Speciality
Fraction Stack from School Speciality
Geometric Shapes from School Speciality
Hot plate from Wal-mart

Judy clocks from School Speciality
Magnetic money from Classroom Direct
Math Their Way materials
Number lines from Classroom Direct
Number stamps from Lakeshore
Number stickers from Lakeshore
Pictures of Native American objects from Barry Blackhawk
Pocket chart from Lakeshore
Price tags from Wal-mart
Protractors from Classroom Direct
Purse from Goodwill
Overhead thermometer and ruler from Classroom Direct
Rain sticks from Native.com
Teddy bear counters from Lakeshore
Weather charts from Classroom Direct

The Small Grouper

For Windows

What is the Small Grouper?

The Small Grouper is a computerized sociometric grouping program that places students into small groups for cooperative learning. Group leaders, neglectees, and isolates are identified. It will put four, five, or six students into a group and each student will be placed with a minimum of one peer that (s)he selected.

How does it work?

Using the Small Grouper is easy, fast, and rewarding! Just print out the "Student Survey," distribute to students to make their choices, collect the surveys, and enter the results into the program. In a few minutes, the program will create groupings of students based on the results of the survey. It really is this simple!

How much does it cost?

The Small Grouper costs $300 per license.

What computers will it run on?

The Small Grouper runs on Windows 95 OSR2, Windows 98, Windows NT 4.0, and Windows 2000 Professional. It requires at least 32 MB of RAM, 5MB of hard drive space, and a CD-ROM drive.

How do I get more information?

Call Dr. Floyd Boschee at 605-677-5801 or 605-624-9659. If you prefer to correspond via email, please forward any inquires to fboschee@usd.edu.

Curriculum-Based Assessment

Project NAME

Wayne State College
Winnebago Public School

In-Service

November 20, 2000

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Assessment Assumptions

1. Standardized tests and classroom assessment do not serve the same purpose.

   Standardized tests are designed to perform an accountability role in education by providing an overall view of student achievement in areas such as math and reading.

   Most standardized tests are norm referenced.

2. Classroom assessment performs a diagnostic role and is an important part of the teaching/learning process.

   Classroom assessment gives a more detailed picture of individual student growth.

3. Standardized tests and classroom assessment perform different roles.

4. Current practices call for a balanced approach to evaluation that include both forms of assessment.

5. Performance-based assessment is an evolving process.

   It is not a finished product.

   It cannot be simply plugged into a school system by following a recipe that lists different assessment tasks for each grade level and subject.

   It is a philosophy that views assessment as a formative, or ongoing, activity.

   It is based on openness in terms of letting students know up front what the standards of performance are and how their performance will be judged.

   It involves students in assessing their work, sometimes, they determine the criteria to be used to assess it.

6. Process for adopting performance-based assessment:

   Re-examine goals

   Determine what types of performances actually indicate attainment of the goals

   Define and agree on standards of performance.

Define and agree on appropriate ways to score performances and portfolios.

Allow enough time to develop the system of performance-based assessment

7. Advantages of performance-based assessment:

Students are more motivated

Teacher and students set higher standards for themselves.

Classroom becomes a true learning environment.

Why Do We Need to Change Classroom Assessment?

For students to succeed in tomorrow's workplace, they will need to be able to think critically, solve problems, work on teams, and communicate effectively. As educators include these types of skills in the curriculum, they realize that those skills cannot be assessed using traditional classroom tests (which often copy the format of standardized tests).

In addition to implementing curricular changes, many teachers are changing how they teach. Recent research on learning has shown that students learn best when they are actively involved. As teachers use a variety of instructional methods that allow students to be active participants in the learning process, they realize that assessment should also offer students opportunities to be actively involved in assessing their own work rather than be passive recipients of test scores.

The emphasis on standardized tests has led many educators to "teach to the test" in an effort to raise scores. Teachers spend time teaching students how to take tests. An appointed committee adjusts curriculums to match the content of standardized tests. Many teachers object to spending valuable classroom time on activities involving preparing for and giving these tests. With all the attention focused on standardized test scores, the public places less value on the day-to-day assessment that occurs in the classroom.

At the same time, there is wide agreement that standardized tests should not be discarded completely. The tests have a place in education in that they perform an accountability function; they: they provide general data for comparison on a large scale that help us see the big picture. It is the combination of the two approaches that many educators are promoting.

Standardized data are useful to policymakers, which usually means reducing complexity to a single score. ***In contrast, assessments designed to***

support instruction are informal, teacher-mandated, adapted to local context, locally scored, sensitive to short-term change in students' knowledge, and meaningful to students. They provide immediate, detailed, and complex feedback. (The later sentence is taken from: Shepard, L. (April 1989, Why we need better assessments. *Educational Leadership 46*, 4-9).

Implication for Learning

Today's Schools

Today's schools must determine new standards, curriculum, teaching methods, and materials. Although SCANS believes that a total reorientation is required, with foresight and planning the know-how we have defined can be incorporated in the five core subjects (**history, geography, science, English,** and **mathematics**) as well as other subjects and the extracurricular activity of schools.

SCANS believes that teachers and schools must begin to help students see the relationships between what they study and its applications in real-world contexts. It is not true that everything we need to know is life we learned in kindergarten; it is true, however, that we can begin that early to learn what life requires.

We believe, after examining the findings of cognitive science, that the most effective way of teaching skills is *"in context."* Placing learning objectives within real environments is better than insisting that students first learn in the abstract what they will then be expected to apply. SCANS suggests three principles from cognitive science to guide real contextual learning in all our schools:

- Students do not need to learn basic skills before they learn problem-solving skills. The two go together. They are not sequential but mutually reinforcing;
- Learning should be reoriented away from mere mastery of information and toward encouraging students to recognize and solve problems; and
- Real know-how–foundation and competencies--cannot be taught in isolation; students need practice in the application of these skills.

The foundation is best learned in the context of the competencies that it supports. Reading and mathematics become less abstract and more concrete when they are embedded in one or more of the competencies; that is, when the learning is "situated" in a systems or a technological problem. When skills are taught in the context of the competencies, students will learn the skill more rapidly and will be more likely to apply it in real situations. Personal characteristics such as self-esteem and responsibility, to use another example, are best developed in teamwork efforts. Choosing between teaching the foundation and the competencies is false; students usually become more proficient faster if they learn both simultaneously. In Sum, learning in order "to know" must never be separated from learning in order "to do." Knowledge and its uses belong together.

Finally, in the Commission's view, the foundation skills should be assessed along with competencies. Deficiencies in basic or thinking skills will be found in the performance of the competencies. These deficiencies need to be pointed out to the student and immediately remedied. But if students can demonstrate the competency properly, they can be assumed to have the foundation they need.

The School of Tomorrow

Just as our workplaces are being reshaped, so are our schools. As other have said, the school of tomorrow can be as different from today as overnight delivery is from the Pony Express.

The SCANS competencies and skills are not intended for special tracks labeled "general" or "career" or "vocational" education. All teachers, in all disciplines, are expected to incorporate them into their class work. The challenge here is to teach the know-how that young people need as an essential element of learning across the curriculum, including the five core subjects. Students will find the content more relevant and challenging. Teachers will find their students more attentive and interested. Employers and college officials will be delighted with the results because the curriculum will be tied to real things in the real world.

The know-how defined by SCANS should be the responsibility of teachers in every curricular and extra-curricular area. These skills can and should be developed in the five core courses, in art and music, in foreign languages, in vocational education, on the school newspaper, or on athletic teams.

The Challenge to Education

Characteristics of Today's and Tomorrow's Schools	
Schools of Today	**Schools of Tomorrow**
Strategy	
* Focus on development of basic skills	Focus on development of thinking skills
* Testing separate from teaching	* Assessment integral to teaching
Learning Environment	
* Recitation and recall from short-term memory	* Students actively construct knowledge for themselves
* Students work as individuals	* Cooperative problem solving
* Hierarchically sequenced--basic before higher order	* Skills learned in context of real problems
Management	
* Supervision by administration	* Learner-centered, teacher directed
Outcome	
* Only some student learn to think	* All students learn to think

Levels of Proficiency

Tomorrow's career ladders require even the basic skills to take on a new meaning. Future jobs will require employees who can **read** well enough to understand and interpret diagrams, directories, correspondence, manuals, records, charts, graphs, tables, and specifications. Without the ability to read a diverse set of materials, employees will not be able to locate the descriptive and quantitative information needed to make decisions or to recommend courses of action.

At the same time, most jobs will call for **writing skills** to prepare correspondence, instruction, charts, graphs, and proposals, in order to make requests, explain, illustrate, or convince.

Mathematics and **computational skills** are also essential. Virtually all employees should be prepared to maintain records, estimate results, use spreadsheets, or apply statistical process controls as they negotiate, identify trends, or suggest new courses of action.

Finally, very few persons will work by themselves. More and more work involves listening carefully to clients and co-workers and clearly articulating one's point of view. Tomorrow's worker will have to **listen** and **speak** well enough to explain schedules and procedures, communicate with customers, work in teams, understand customer concerns, describe complex system and procedures, probe for hidden meanings, teach others, and solve problems.

Assessment

SCANS understands that the large numbers of local, state, and nationwide examinations that are already administered in the nation's school add up to a nearly overwhelming burden in the nation's classrooms. SCANS has no desire to add to a testing system that is already extensive. But it is convinced that most existing tests--largely pencil and paper, multiple-choice test of short-term memory--do little to advance the cause of learning. Effective assessment techniques should support instruction and students' knowledge of their progress.

Assessments must be designed so that, when teachers teach and students study, both are engaged in authentic practice of valued competencies. SCANS aims to promote the development and use of assessments that can provide the basis for a new kind of high school credential. This credential will measure mastery of specific, learnable competencies. This approach is intended to renew the dignity of the high school diploma, giving it real meaning as a mark of competence.

Certifying the five competencies can serve several purposes not now being achieved. They will link school credentials, student effort, and student achievement; they will provide an incentive for students to study; and they will give employers a reason to pay attention to school records. Finally, they will provide a clear target for instruction and learning. Assessment can then help improve achievement, not simply monitor it.

Authentic Assessment: Toward a Definition

Howard Gardner proposes that an authentic assessment must occur in context, much like what occurs in an apprenticeship situation, where the apprentice must demonstrate ability to perform skills of a particular craft. Grant Wiggins defines authentic assessment as assessment in which students must perform exemplary tasks that are typically required when one has mastered a particular discipline. Stefonek (1991) summarizes the thinking of various experts in the field of authentic assessment. Factors include:

* Methods that emphasize learning and thinking, especially higher-order thinking skills such as problem-solving strategies;

- Tasks that focus on students' ability to produce a quality product or performance;
- Disciplined inquiry that integrates and produces knowledge, rather than reproduces fragments of information others have discovered;
- Meaningful tasks at which students should learn to excel;
- Challenges that require knowledge in good use and good judgment;
- A new type of positive interaction between the assessor and assessee;
- An examination of differences between trivial school tasks (e.g., giving definitions of biological terms) and more meaningful performance in non-school settings (e.g., completing a field survey of wildlife), and
- Involvement that demystifies tasks and standards.

Most definitions contain two (2) major parts:

1. Alternative to traditional tests; and
2. Direct examination of student performance on significant tasks that are relevant to life outside of school.

General Attributes of the CBA

Sample items are either selected from the curriculum or constructed to match the curriculum.

These items are then ordered by difficulty and combined within a single test. (Day 1)
Two more forms of the tests, containing similar items and identical orders of difficulty are constructed. (Days 2 & 3).

To control for sporadic student response, it highly recommended that the test be conducted in this way, i.e., 3 separate days.

Unlike the standardized test of the student's speed and accuracy, the CBA assessment from is developed to record student responses. Performance criteria are then established to determine acceptable levels of student performance or mastery.

Performance criteria can be developed that reflect a typical grade-level skill. Normative sampling can be used. Take samples of the student considered to be of average and above average performance. Teachers use these to establish a norm or performance criteria for a year (grade).

For the student of lower achievement, the CBA can tell exactly where the student is performing per concept or skill. It also give information regarding his/her achievement in relation to the "norm."

Development of the Math CBA

Taken from and adapted: Author: Dr. Lorna Idol at the University of Illinois

Step 1:
Use the WPS curriculum guide, the table of contents of a published math text, scope and sequence charts, placement tests, etc.
Most of the relevant concepts will be represented in these sources
Check all sources carefully to ensure development of a comprehensive CBA

Step 2:
Make a list of the concepts identified within the curriculum

Step 3:
Construct a raw data sheet containing concepts and page numbers in WPS guide, sources for teaching each concept by this format—
The left column contains a listing of the concepts.
The middle column contains a listing of the sources for practice opportunities.
The right column – see Step 5

Step 4:
Reorder the concept list if the order is not progressive and logical.
Provide a task analysis of math operations and include a hierarchical sequence for teaching concepts and operations. [See Howell & Nolet, page 366]

Step 5:
Determine if all the concepts have enough practice.
The right column of the data sheet should contain the total number of practice items for each concept.

Step 6:
If the results of Step 5 indicate that there are insufficient practice opportunities for certain concepts, include more citings of resources, etc.

Step 7:
Organize the curriculum by concept, sequence, etc. (WPS has already completed this task)

Summary Sheet for a Math CBA

Student's Name ____________ Grade ____________ Dates 1 ____ 2 ____ 3 ____

Concepts	Problem Numbers	Day 1	Day 2	Day 3	Total Score 5/6	Mastery 5/6
Writing digits	1, 2	/2	/2	/2	/6	/6
Place value	3, 4	/2	/2	/2	/6	/6
Comparing numbers	5, 6	/2	/2	/2	/6	/6
Divides 2 digits by 2 digit (remainder)	65, 66	/2	/2	/2	/6	/6
Fraction for part of whole	79, 80	/2	/2	/2	/6	/6
Writing time (hrs. & 5 min.)	83, 84	/2	/2	/2	/6	/6

Example Showing Only Six Concepts/Competencies from a Year's Curriculum

Step 8:

Determine and code those concepts that can be taught simultaneously.

Sometimes different concepts may be so interrelated and complementary that they should be taught simultaneously. Determine in advance where this is to occur.

Step 9:

Construct placement tests that are organized by concept.

Make certain that the important subsets within each concept are represented.

Step 10:

Administer the placement tests.

Give only as many tests as the estimated skill levels of the student might indicate is appropriate. [There is no reason to waste time testing at upper levels if it is evident that a student is functioning at a lower level.]

It is recommended that the test should be given on three separate occasions, using different forms of the test on each day.

It is recommended that the speed of computation (rate or correct problems per minute, cppm) as well as accuracy be measured. This can be done by recording the amount of time taken to complete the tests. For group testing, the students can be given a certain amount of time for test completion.

Step 11:

Enter the performance data on a student summary sheet at the end of each of the three testing sessions.

This sheet serve as a record-keeping system for recording mastery and non-mastery of all concepts represented on the CBA form. [See attachment]

Step 12:

Determine which concepts the student will begin to work on.

It is recommended that median performance across the three days be used as the measure for each test.

A criterion level to determine test mastery must be established by the teachers. [See the attachment for an example= 5 out of 6 or 83% correct for mastery on the concept.]

Step 13:

Construct a yearly progress chart.

It should include years spent in school and concepts contained within the curriculum. [See attachment 2]

This chart can be used for two purposes:

1. To record the placement of the student in the curriculum
2. To record monthly progress of student through the curriculum.

Step 14:

Construct a daily progress chart to monitor daily progress of the students.

CLASS SKILLS PROFILE - Computation

Teacher: Mrs. Smith
Report through 3/17

Name	A1	S1	M1	M2	M3	D1	D2	D3	F1	F2
Adam Qualls	▣	▣	▣	▥	▥	▥	▥	▥	■	▥
Amanda Ramirez	■	▥	▣	▥	▥	▤	▥	□	■	□
Anthony Jones	▥	▥	▣	▥	▥	▥	▥	▥	□	□
Aroun Phung	■	■	■	■	■	■	▥	▥	■	■
Becca Jarrett	▣	▣	■	▣	▥	▣	▥	▥	■	■
Charles McBride	▣	■	▣	■	▥	■	▥	▥	■	■
Christi Stinson	■	▤	■	▥	▥	□	□	□	▥	■
Cindy Lincoln	▤	▥	■	■	▤	▣	■	□	▥	■
David Anderson	▥	▥	▣	▣	▥	▤	▥	▥	■	■
Emily Waters	▣	■	■	▣	▥	■	■	▥	■	■
Erica Jernigan	▤	▥	▣	▥	▥	▥	▥	□	□	□
Gary McKnight	■	■	■	■	▥	■	▥	▥	■	■
Jenna Clover	▣	▣	▣	■	▤	■	▥	□	■	■
Jonathan Nichols	▣	▤	■	▣	▥	▣	□	□	▥	▤
Jung Lee	▣	■	▣	■	■	■	■	■	■	■
Kaitlin Laird	■	▥	▣	▤	▥	▤	▥	□	■	■
Kathy Taylor	■	■	■	■	■	■	▥	▤	■	■
L.B. Carver	■	▤	▣	▤	▥	▣	□	▥	■	■
Matthew Hayes	■	■	■	■	■	▤	▥	▤	■	■
Michael Elliott	■	□	■	■	▥	■	▥	▥	▥	■
Michael Sanders	▥	▥	■	▥	▥	▤	▥	□	■	▥
Samantha Spain	▤	■	■	▣	▤	■	■	■	■	■
Vicente Gonzalez	▣	▣	■	▣	■	▤	□	□	▣	□
Victoria Dillard	■	▥	■	■	▥	▣	▥	▥	■	▥
Yasmine Sallee	■	■	■	■	■	■	■	▣	■	□

□ COLD. Not tried	0	1	0	0	0	1	4	9	2	5
▥ COOL. Trying these.	3	8	0	6	16	3	16	11	4	3
▤ WARM. Starting to get it.	3	3	0	2	3	6	0	2	0	1
▣ VERY WARM. Almost have it.	4	3	9	4	0	5	0	1	1	0
■ HOT. You've got it!	15	10	16	13	6	10	5	2	18	16

Figure 1.7. Class Skills Profile of the sample Class Report.

Measurement could include:

- Percentage correct of problems completed
- Correct problems per minute (cppm)
- Correct facts per minute (cfpm)

Step 15.

Use a lesson plan sheet to plan the procedures that will be used when beginning math instruction. [This sheet was issued earlier this year]

Administering the CBA

The teacher passes the CBA test on Day 1, telling the student that it is a test on how much they know about math (e.g., addition, division, fraction, etc.)

Tell the students this not a test for a grade but rather a test designed to find out what the teachers need to know to improve their teaching of the students.

Tell the students to do their best, but if they come to a problem they cannot solve, they should spend only a very few minutes on it and then move quickly to the next type of problem.

If the student needs certain materials to perform the test, such as a ruler, provide these items.

Similar instructions are given on Day 2 and Day 3.
The CBA should be designed so that the teachers can give the entire test either as a placement tool (to a whole class, a small group, or an individual student) and as a final assessment.

It should be possible to use only a part of the CBA to test specific skill areas. In giving the entire CA, the teacher should allow for 30 to 45 minutes of work time in each day of testing.

The problem types are repeated across 3 days, with 3 different examples of the same type. [See attachment]

For Your Information ....

What Work Requires of Schools:
A SCANS Report for America 2000

The Commission based the report on interviews with employers in both private and public sectors, managers of employees, union officials, and U. S. workers. The SCANS document carries serious implications for parents, employers, and educators. **Parents** must insist that their sons and daughters master the **"Workplace Know-How"** and that their local schools teach it. Unless the children master these skills, they are unlikely to earn a decent living. If the students do not learn these skills by the time they leave high school, they face bleak prospects--dead-end work, interrupted only by periods of unemployment, with little chance to climb a career ladder. **Employers** must orient their business practices to hiring and developing this know-how in employees. Nine out ten employees are operating on yesterday's workplace skills. Employers should tell educators what is needed and work with the schools to accomplish the skills instruction. **Educators** have to instill in students the perspective on results that the SCANS skills demand. If you do not, you will be failing your students and your community as they try to adjust to the next century. You, more than anyone, are responsible for helping develop the skills our children need.

What can educators do?

First, tell your students what the standards are---what is expected of them.

Second, give them the benefit of a fair and firm assessment of where they stand and what they need to do. If they pass from grade to grade and receive diplomas without mastering these skills, they cannot make their way in the work of work.

Third, inject the competencies and the foundation SCANS has defined into every nook and cranny of the school curriculum. Your most gifted students need this know-how, and so do those experiencing the greatest difficulties in the classroom. We are convinced that if students are taught the know-how in the context of relevant problems, you will find them more attentive, more interested,--indeed, more teachable--because they will find the coursework challenging and relevant.

Finally, ask for the materials the Department of Labor can make available to you. Use them with your colleagues and the local business community to have your students confirm that the SCANS skills represent real work in your home town.

(Taken from pages vii-ix of the Report).

Workplace Know-How

The know-how identified by SCANS is made up of five competencies and a three-part foundation of skills and personal qualities that are needed for solid job performance. These include:

Competencies- effective workers can productively use:

- **Resources-** allocating time, money, materials, space, and staff;

- **Interpersonal Skills-** working on teams, teaching others, serving customers, leading, negotiating, and working well with people from culturally diverse backgrounds;

  Information- acquiring and evaluating data, organizing and maintaining files, interpreting and communicating, and using computers to process information;

  Systems- understanding social, organizational, and technological systems, monitoring and correcting performance, and designing or improving systems; and,

  Technology- selecting equipment and tools, applying technology to specific tasks, and maintaining and troubleshooting technologies.

The Foundation- competence requires:

Basic Skills- reading, writing, mathematics, speaking, and listening;

Thinking Skills- thinking creatively, making decisions, solving problems, seeing things in the mind's eye, knowing how to learn, and reasoning;

Personal Qualities- individual responsibility, self-esteem, sociability, self-management, and integrity.

A Three-Part Foundation

Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens and speaks:

A. ***Reading-*** locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules

B. ***Writing-*** communicates thoughts, ideas, information, and messages in writing, and creates documents such as letters, directions, manuals, reports, graphs, and flow charts

C. ***Mathematics-*** performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques

D. ***Listening-*** receives, attends to, interprets, and responds to verbal messages and other cues

E. ***Speaking-*** organizes ideas and communicates orally

Thinking Skills: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn, and reasons:

A. ***Creative Thinking-*** generates new ideas

B. ***Decision Making-*** specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative

C. ***Problem Solving-*** recognizes problems and devises and implements plan of action

D. ***Seeing Things in the Mind's Eye-*** organizes, and processes symbols, pictures, graphs, objects, and other information

E. ***Knowing Hot-to-Learn-*** uses efficient learning techniques to acquire and apply new knowledge and skills

F. ***Reasoning-*** discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem

Personal Qualities: Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty:

A. ***Responsibility-*** exerts a high level of effort and perseveres towards goal attainment

B. ***Self-Esteem-***believes in own self-worth and maintains a positive view of self

C. ***Sociability-*** demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings

D. ***Self-Management-*** assesses self accurately, sets personal goals, monitors progress, and exhibits self-control

E. ***Integrity/Honesty-*** chooses ethical courses of action.

SCANS
National Goals #3 and #5

Goal #3 American students will leave grades four, eight, and twelve having demonstrated competency in challenging subject matter including English, mathematics, science, history, and geography; and every school in America will ensure that all students learn to use their minds well, so they may be prepared for responsible citizenship, further learning, and ***productive employment in our modern economy.*** (emphasis added)

Goal #5 Every adult American will be literate and will ***possess the knowledge and skills necessary to compete in a global economy*** and exercise the rights and responsibilities of citizenship. (emphasis added)

High-Performance Work and Schools

The World Has Changed

A strong back, the willingness to work, and a high school diploma were once all that was needed to make a start in America. They are no longer. A well-developed mind, a passion to learn, and the ability to put knowledge to work are the new keys to the future of our young people, the success of our businesses, and the economic well-being of the nation.

Common Elements: Five Competencies

The expert worker of tomorrow will not simply "pick-up" these five competencies. Their acquisition must begin in the schools and be refined through on-the-job experience and further training. Teaching and learning the competencies must become the tasks of our schools and students.

Competent works will demonstrate their skill in managing or using:

1. **Resources.**
   Workers schedule time, budget funds, arrange space, or assign staff.

2. **Interpersonal skills.**
   Competent employees are skilled team members and teachers of new workers;
   They serve clients directly and persuade co-workers either individually or in groups;
   They negotiate with others to solve problems or reach decisions;
   They work compatibly with colleagues from diverse backgrounds; and,
   They challenge existing procedures and policies.

3. **Information.**
   Workers are expected to identify, assimilate, and integrate information from diverse sources;
   They prepare, maintain, and interpret quantitative and qualitative records;
   They convert information from one form to another and are comfortable conveying information, orally and in writing, as the need arises.

4. **Systems.**
   Workers should understand their own work in the context of the work of those around them;
   They understand how parts of systems are connected, anticipate consequences, and monitor and correct their own performance;
   They can identify trends and anomalies in system performance, integrate multiple displays of data, and link symbols (e.g., displays or a computer screen) with real phenomena.

5. **Technology.**
   Technology today is everywhere, demanding high levels of competence in selecting and using appropriate technology, visualizing operations, using technology to monitor tasks, and maintaining and trouble-shooting complex equipment.

The Secretary's Commission on Achieving Necessary Skills: U. S. Department of Labor, 1991

Multiple Intelligence Approached to Assessment:
Solving the Assessment Conundrum
by David Lazear

Tucson, AZ, Zepher Press
1994,
(Excerpts)

"We are now entering the modern age of education in which we tailor learning to suit the learner instead of making students adapt to necessarily narrow teaching styles and methods. And nowhere is that shift in honoring the many different intelligences more necessary then in the realm of assessment in which a "one-size-fits-all" view of testing has dominated education since medieval examination days." Grant Wiggins, Director of Research and Programs, Center on Learning Assessment and School Structure (CLASS), Geneseo, NY.

"The desire to know in quantifiable terms exactly what our students have learned is a peculiarly American trait, but here seems to be little correlation between testing and producing successful students. American students are among the most tested yet academically deficient in the industrialized world. According to many educators and psychologists--even the head of Educational Testing Service--standardized tests just do not pass muster as a method of improving student performance. In fact they may be undermining the very purpose they were intended to serve." Emily Grady, 1992 in *The Portfolio Approach to Assessment,* Phi Delta Kappa Educational Foundation.

What if we provided parents with a picture of a whole child in the reports we send home, giving in our reports dynamic, developmental profiles of children, as opposed to norm- or criterion-referenced, quantity-based scores? What if we were to create assessment instruments that valued the subjective aspects of one's learning equally with the mastery of certain so-called objective tests? ...assessment would be focused on enhancing learning, amplifying self-understanding, and expanding students' full intellectual development. p. 12

What About Report Cards?
....I do believe that it is possible to send home reports that give parents a relatively complete and holistic picture of their children's intellectual development.

....Although school boards, state legislators, parents, and the general public tend to be biased in favor of verbal-linguistic and logical-mathematical development, often at the expense of the development of the other intelligences, there is nothing preventing us from creating reports that give the traditional reading, writing, and arithmetic information as well as the larger story of children's full intellectual development

Toward Creating Authentic Assessments

It seems that we have forgotten something very important in our Western systems of education when it comes to evaluating students' academic progress; namely, assessment should be an opportunity to enhance, empower, and celebrate students' learning. Instead, we often use it as an opportunity to point out students' failure.

....we as a society have to rank students in terms of their supposed academic ability, to compare them to one another, and to determine the quality of our schools based on students' standardized test scores, which we compare by publishing them in the newspaper.

One of the underlying supports that we must change if we are to be aligned with the new assessment paradigm (to say nothing of the findings of current educational research) is that the evaluation of learning and knowledge happens on a bell-shaped curve. In fact this model precludes all students succeeding, for some MUST fail, MOST are average, and only a FEW can be truly successful.

The bell-shaped curse does have its uses, however. It is an excellent tool for sorting people into various categories such as likes and dislikes of certain topics, shoe size, hair color, age, weight, and TV viewing preferences. ... It is simply not an accurate picture of how knowing, understanding, and learning happens!

The J-curve is a far more accurate picture of the growth of knowledge. This curve suggests that knowledge grows in a compounding fashion. We start with a little knowledge and the, year by year, we build on this knowledge so that our foundation of knowing is enhanced, expanded and deepened as we mature. If our assessment practices are to reflect this growth, we must provide opportunities for students to demonstrate their growing knowledge and learning to use in whatever ways they can. Students must be assessed to know what they know fully. What this means is that assessment should genuinely benefit students.

LEARNER OUTCOMES

SELF-DIRECTED LEARNER

- Sets priorities and achievable goals.
- Evaluates and manages own progress toward goals.
- Creates options for self.
- Takes responsibility for actions.
- Creates a positive vision for self and future.

COLLABORATIVE WORKER

- Evaluates and manages own behavior as a group member.
- Evaluates and manages group functioning to meet the group's goal.
- Demonstrates interactive communication.
- Demonstrates consideration for individual differences.

COMPLEX THINKER

- Effectively accesses, evaluates and integrates information from a variety of resources.
- Selects thinking processes appropriate to the resolution of complex issues.
- Uses a wide variety of thinking processes with accuracy to resolve complex issues.

COMMUNITY CONTRIBUTOR

- Demonstrates knowledge about his or her diverse communities (such as classroom, school or city).
- Plans and takes action for the welfare of the community.
- Reflects on role as a community contributor.

QUALITY PRODUCER

- Creates product that achieve their purpose.
- Creates product appropriate to the intended audience.
- Creates product that reflect craftsmanship.
- Uses resources/technology.

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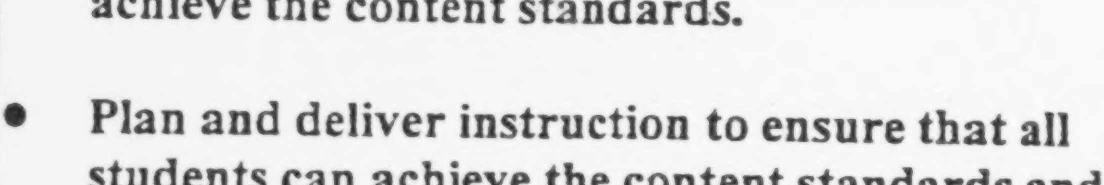
PERFORMANCE-BASED EDUCATION

- Define the content standards and learner outcomes clearly and make them public.
- Establish criteria and high standards for student performance.
- Assess achievement on the basis of student performance.
- Design curriculum to ensure that students achieve the content standards.
- Plan and deliver instruction to ensure that all students can achieve the content standards and make progress toward the learner outcomes.
- Make time and opportunities available for all students to achieve the content standards.



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ASSESSMENT TYPES

Selected Response	Choose answer from set of alternatives
Short Answer Oral / Written	Provide a brief answer
Constructed Response	Draw a diagram, picture, make a model
Extended Response Oral / Written	Write or answer orally
Performance	Do, create, perform the answer
Personal Communication	Respond to questions-interview
Observation	Observe behavior
Student Self-Assessment	Student evaluates, reflects on learning

Body of Evidence: A collection of information about student progress in meeting a benchmark which incorporates multiple assessments and a variety of assessment strategies and includes performance assessment as a fundamental component.

Assessment Type	Definition	Examples
• Selected Response	Choosing the answer from a set of alternatives.	✓ multiple choice tests ✓ true/false questions ✓ matching
• Short Answer or Constructed Response	Providing a brief answer in writing or by drawing a diagram or picture.	✓ solve a math problem and show your work. ✓ draw a diagram to show how events are related. ✓ outline the major concepts. ✓ fill-in the blank questions. ✓ diagram a sports play. ✓ draw a picture to show how to play a note on a musical instrument.
• Extended Written or Oral Response	Writing or speaking the answer.	✓ list the most important causes of an event and explain your choices. ✓ compare and contrast two concepts. ✓ describe how to conduct an experiment. ✓ choose from a set of alternatives and justify your answers.
• Performance Assessment	Demonstrating the skills and knowledge by doing, creating, or performing the answer, as opposed to choosing or writing about it.	✓ APS Authentic Task ✓ conducting a scientific investigation. ✓ engaging in historical analysis. ✓ writing a short story. ✓ writing a formal essay. ✓ creating and solving a "real-life" math problem. ✓ playing a musical passage you have composed. ✓ doing a painting. ✓ acting in a play.
• Personal Communication and Observation	Assessing what students know or can do by how they respond to questions or observing their behavior.	✓ asking and responding to questions in student journals. ✓ observing class discussions. ✓ asking follow-up questions after/during a presentation. ✓ readers/writers workshop conferences.
• Student Self-assessment	Students evaluating/reflecting on their own learning.	✓ evaluating writing using a rubric. ✓ listing strengths and weaknesses as a reader and setting goals for improvement. ✓ self-critique of a video of a performance or speech. ✓ evaluating the validity of a science experiment.

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Aurora Public Schools - Aurora, Colorado

DEFINITIONS

Assessment - the process by which a student's knowledge and skills can be measured.

Alternative assessments - methods other than traditional measurement.

Authentic assessment - a measurement method which requires a student to demonstrate essential knowledge and skills by performing real life tasks or close approximations.

Performance assessment - a method of measurement which requires a student to demonstrate essential knowledge and skills by doing, creating, or performing. Performance assessments usually share many aspects of authentic assessments.

Traditional assessment - commonly-used methods of assessment which include items such as multiple-choice, short answer, completion and true-false.

Secured assessments - assessments which are administered under controlled conditions (for example: timed, taken without help). Even though the student knows what knowledge and skills will be assessed and what criteria and performance standards will be applied, the student does not know the exact content of the assessment ahead of time.

Body of Evidence - a collection of information about student progress in meeting a benchmark for a content standard. The collection incorporates data from multiple assessments and a variety of assessment strategies.

Content Standard or Proficiency - a specific statement of what a student should know or be able to do. There are 35 content standards across eight subject areas identified by the APS strategic planning process (Arts and Humanities, Communication, Life and Career Management, Mathematics Proficiency, Multicultural Education, Science Literacy, Social Science, and Technology).

Cornerstone Standards or Proficiency - standards that provide a foundation for achievement of all content standards. They are CO#1-Reading, CO#2-Writing and MA#3-Number Sense

Benchmark - a statement of what a student should know and be able to do at specific levels in order to meet the content standard (proficiency). These levels are primary, upper elementary, middle school and high school.

Learner Outcomes - five outcomes for student success identified by the APS strategic planning process: Self-Directed Learner, Collaborative Worker, Complex Thinker, Community Contributor and Quality Producer.

Characteristics - specific descriptions of behaviors that explain and clarify each Learner Outcome.

Performance-Based Education - a process for learning that requires students to demonstrate the knowledge and skills necessary to be successful not only in school, but in life.

Performance Standard - the agreed-upon level of proficiency which a student is expected to achieve. It describes how well a student must do to demonstrate the achievement of a content standard (proficiency) or progress toward a Learner Outcome characteristic.

Portfolio - a purposeful collection of student work assembled over time, which demonstrates a student's knowledge, abilities, and growth. Assembling a portfolio may allow student choice.

Working portfolio - a collection of samples that show the student's growth and self-reflection. Samples may represent work in progress.

Showcase portfolio - a collection of the student's best work, representing the student's ability to set goals, self-evaluate, and select examples that demonstrate individual interests, talents and achievement.

Rubric - a set of criteria for scoring student work, providing a description of the varying levels of achievement on an established scale. In Aurora Public Schools, the rubric guidelines include levels 1 - 4 and N (no attempt/insufficient evidence); level 3 describes performance that meets the standard.

Stakeholders - includes students, the Board of Education, teachers, other certificated and classified staff, patrons, parents and administrators.

Validation - a verification that the student has met or exceeded a content benchmark by demonstrating the skills and knowledge identified in the benchmark. A validation is based on the data from a body of evidence.

Revised by Instructional Services, June 1998.

Math CBA

Day 1
Elementary Level

Give the number:

1. 9 tens, 6 ones ______

2. 3 thousand, 7 hundred forty-one ______

Tell what place 7 holds:

3. 271 ______

4. 8,726 ______

Compare the numbers. Use > or < :

5. 32 ______ 49

6. 2×3 ______ 10

Add:

7. $\begin{array}{r} 2 \\ \underline{+6} \end{array}$

8. $\begin{array}{r} 7 \\ \underline{+5} \end{array}$

9. $\begin{array}{r} 42 \\ \underline{+21} \end{array}$

10. $\begin{array}{r} 76 \\ \underline{+17} \end{array}$

11. $\begin{array}{r} 231 \\ \underline{+243} \end{array}$

12. $\begin{array}{r} 373 \\ \underline{+147} \end{array}$

13. $7 + 2 + 5 =$ ______

14. $\begin{array}{r} 3692 \\ \underline{+2345} \end{array}$

Subtract:

15. $\begin{array}{r} 8 \\ \underline{-7} \end{array}$

16. $\begin{array}{r} 11 \\ \underline{-4} \end{array}$

17. $\begin{array}{r} 87 \\ \underline{-43} \end{array}$

18. $\begin{array}{r} 76 \\ \underline{-59} \end{array}$

19. $\begin{array}{r} 588 \\ \underline{-164} \end{array}$

20. $\begin{array}{r} 349 \\ \underline{-187} \end{array}$

Add or subtract:

21. $\begin{array}{r} 4 \\ \underline{+3} \end{array}$

22. $\begin{array}{r} 6 \\ \underline{+3} \end{array}$

23. $\begin{array}{r} 9 \\ \underline{-4} \end{array}$

24. $\begin{array}{r} 55 \\ \underline{+31} \end{array}$

25. $\begin{array}{r} 15 \\ \underline{-8} \end{array}$

26. $\begin{array}{r} 24 \\ \underline{+36} \end{array}$

27. $\begin{array}{r} 79 \\ \underline{-25} \end{array}$

28. $\begin{array}{r} 401 \\ \underline{+296} \end{array}$

29. $\begin{array}{r} 82 \\ \underline{-37} \end{array}$

30. $\begin{array}{r} 242 \\ \underline{+369} \end{array}$

31. $\begin{array}{r} 865 \\ \underline{-321} \end{array}$

32. $4 + 4 + 6 =$ ______

33. $\begin{array}{r} 824 \\ \underline{-717} \end{array}$

34. $\begin{array}{r} 4654 \\ \underline{+1975} \end{array}$

Fill in the missing number:

35. 3 + ______ = 9   36. 57 − ______ = 39

Look at the pictures of the x's and fill in the blanks for the problem:

Example: xx xx xx

3 × 2

37. xxx xxx

______ × ______

38. x x

______ × ______

Multiply:

39. 6 × 3 = ______   43. 8 × 9 = ______

40. 5 × 7 = ______   44. 8 × 7 = ______

41. 6 × 8 = ______   45. 3 × 4 × 3 = ______

42. 9 × 5 = ______   46. 7 × 3 × 1 = ______

47. $\begin{array}{r}10\\ \underline{\times 6}\end{array}$ 48. $\begin{array}{r}100\\ \underline{\times 3}\end{array}$ 49. $\begin{array}{r}70\\ \underline{\times 8}\end{array}$ 50. $\begin{array}{r}90\\ \underline{\times 8}\end{array}$

51. $\begin{array}{r}45\\ \underline{\times 2}\end{array}$ 52. $\begin{array}{r}55\\ \underline{\times 5}\end{array}$ 53. $\begin{array}{r}672\\ \underline{\times 5}\end{array}$ 54. $\begin{array}{r}535\\ \underline{\times 2}\end{array}$

Divide:

55. 8 ÷ 2 = ______   59. 0 ÷ 3 = ______

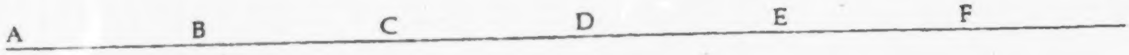
56. 10 ÷ 5 = ______   60. 0 ÷ 4 = ______

57. 54 ÷ 9 = ______   61. 81 ÷ 9 = ______

63. $18\overline{)54}$ 64. $12\overline{)24}$ 65. $8\overline{)34}$ 66. $6\overline{)31}$ 67. $35\overline{)78}$ 68. $17\overline{)39}$

Fill in the numbers:

69. _______ × 8 = 48 70. _______ ÷ 2 = 6



71. How long is the line from point A to D?

_______ inches

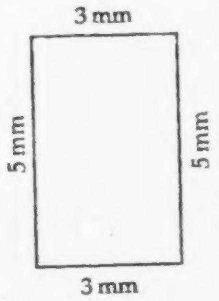
72. How long is the line from point C to F?

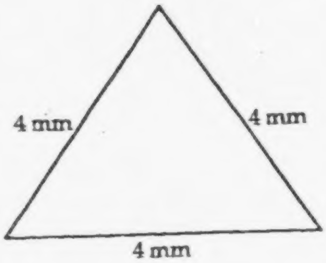
_______ inches

Convert to inches:

73. 1 foot = _______ inches 74. 1 foot + 8 inches = _______ inches

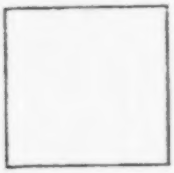
Find the perimeter:



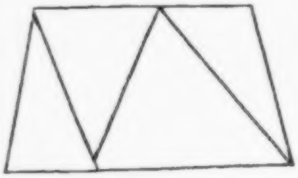


75. _______ millimeters 76. _______ millimeters

Count the number of shapes:

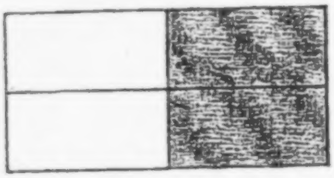


77. ______

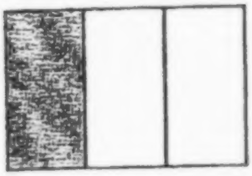


78. ______

Give a fraction to tell how much is shaded:



79. ______



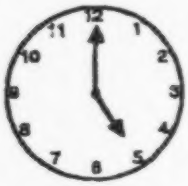
80. ______

Use $ or ¢ to show the total value:

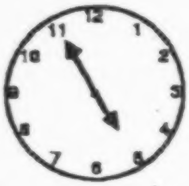
81. 3 dollars, 8 dimes, 3 pennies = ______

82. 7 nickels, 15 pennies = ______

Write the time shown on each clock:


12
1
2
3
4
5
6
7
8
9
10
11

83. ______


12
1
2
3
4
5
6
7
8
9
10
11

84. ______

Find each answer:

85. Marsha had 24 blocks. Mel had 38. How many blocks did they have in all? _______

86. 342 books in the library. 20 checked out. How many left? _______

87. 20 rows of stamps. 8 stamps in a row. How many stamps in all? _______

88. Pencils are 7¢ each. How many can you buy with 30¢? _______

Day 2
Elementary Level

Math CBA

Give the number:

1. 8 tens, 9 ones ______

2. 9 thousand, 2 hundred seventy-eight ______

Tell what place 7 holds:

3. 937 ______

4. 7,453 ______

Compare the numbers. Use > or <:

5. 62 ______ 67

6. 6 + 4 ______ 9

Add:

7. $\begin{array}{r} 2 \\ +5 \\ \hline \end{array}$
8. $\begin{array}{r} 9 \\ +6 \\ \hline \end{array}$
9. $\begin{array}{r} 52 \\ +36 \\ \hline \end{array}$
10. $\begin{array}{r} 16 \\ +27 \\ \hline \end{array}$
11. $\begin{array}{r} 170 \\ +325 \\ \hline \end{array}$

12. $\begin{array}{r} 695 \\ +326 \\ \hline \end{array}$
13. 8 + 1 + 9 = ______
14. $\begin{array}{r} 2342 \\ +5168 \\ \hline \end{array}$

Subtract:

15. $\begin{array}{r} 4 \\ -0 \\ \hline \end{array}$
16. $\begin{array}{r} 12 \\ -3 \\ \hline \end{array}$
17. $\begin{array}{r} 59 \\ -18 \\ \hline \end{array}$
18. $\begin{array}{r} 67 \\ -19 \\ \hline \end{array}$
19. $\begin{array}{r} 385 \\ -275 \\ \hline \end{array}$
20. $\begin{array}{r} 931 \\ -391 \\ \hline \end{array}$

Add or subtract:

21. $\begin{array}{r} 5 \\ +1 \\ \hline \end{array}$
22. $\begin{array}{r} 5 \\ +8 \\ \hline \end{array}$
23. $\begin{array}{r} 9 \\ -5 \\ \hline \end{array}$
24. $\begin{array}{r} 63 \\ +32 \\ \hline \end{array}$
25. $\begin{array}{r} 17 \\ -8 \\ \hline \end{array}$

26. $\begin{array}{r} 39 \\ +42 \\ \hline \end{array}$
27. $\begin{array}{r} 63 \\ -41 \\ \hline \end{array}$
28. $\begin{array}{r} 555 \\ +430 \\ \hline \end{array}$
29. $\begin{array}{r} 51 \\ -25 \\ \hline \end{array}$
30. $\begin{array}{r} 578 \\ +234 \\ \hline \end{array}$

31. $\begin{array}{r} 497 \\ -352 \\ \hline \end{array}$
32. 6 + 4 + 3 = ______
33. $\begin{array}{r} 125 \\ -117 \\ \hline \end{array}$
34. $\begin{array}{r} 6234 \\ +3829 \\ \hline \end{array}$

Fill in the missing numbers:

35. ______ + 5 = 7   36. 74 − ______ = 36

Look at the pictures of the x's and fill in the blanks for the problem:

Example:
xx xx
2 × 2

37.
xx xx
______ × ______

38.
x x
______ × ______

Multiply:

39. 4 × 5 = ______
40. 6 × 6 = ______
41. 7 × 6 = ______
42. 7 × 7 = ______
43. 7 × 8 = ______
44. 9 × 9 = ______
45. 5 × 3 × 2 = ______
46. 6 × 1 × 3 = ______

47. 10 ×4
48. 100 ×7
49. 80 ×4
50. 40 ×6

51. 93 ×5
52. 35 ×3
53. 542 ×4
54. 156 ×3

Divide:

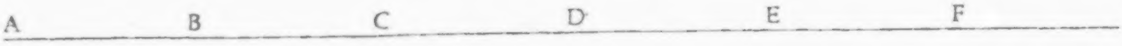
55. 9 ÷ 3 = ______
56. 6 ÷ 3 = ______
57. 45 ÷ 9 = ______
58. 54 ÷ 6 = ______
59. 0 ÷ 6 = ______
60. 0 ÷ 2 = ______
61. 72 ÷ 8 = ______
62. 56 ÷ 7 = ______

63. $24\overline{)48}$ 64. $30\overline{)90}$ 65. $7\overline{)22}$ 66. $9\overline{)23}$ 67. $15\overline{)48}$ 68. $26\overline{)49}$

Fill in the numbers:

69. 7 × ______ = 42

70. 32 ÷ ______ = 4



71. How long is the line from point C to G? ______ inches

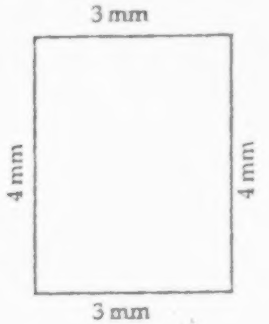
72. How long is the line from point B to G? ______ inches

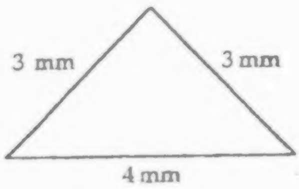
Convert to inches:

73. 1 yard = ______ inches

74. 1 foot + 3 inches = ______ inches

Find the perimeter:

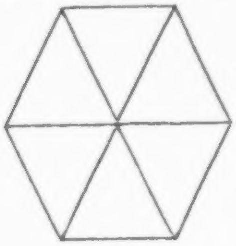


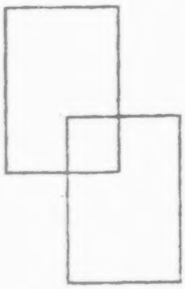


75. ______ millimeters

76. ______ millimeters

Count the number of shapes:





77. ______

78. ______

Day 3
Elementary Level

Math CBA

Give the number:

1. 7 tens, 1 one ______ 2. 6 thousand, 4 hundred thirty-two ______

Tell what place 7 holds:

3. 724 ______ 4. 5,271 ______

Compare the numbers. Use > or < :

5. 75 ______ 85 6. 12 ÷ 2 ______ 8

Add:

7. $\begin{array}{r} 9 \\ \underline{+0} \end{array}$ 8. $\begin{array}{r} 6 \\ \underline{+5} \end{array}$ 9. $\begin{array}{r} 21 \\ \underline{+48} \end{array}$ 10. $\begin{array}{r} 59 \\ \underline{+16} \end{array}$ 11. $\begin{array}{r} 674 \\ \underline{+323} \end{array}$

12. $\begin{array}{r} 276 \\ \underline{+235} \end{array}$ 13. 9 + 7 + 2 = ______ 14. $\begin{array}{r} 5671 \\ \underline{+4437} \end{array}$

Subtract:

15. $\begin{array}{r} 8 \\ \underline{-1} \end{array}$ 16. $\begin{array}{r} 11 \\ \underline{-9} \end{array}$ 17. $\begin{array}{r} 64 \\ \underline{-23} \end{array}$ 18. $\begin{array}{r} 91 \\ \underline{-37} \end{array}$ 19. $\begin{array}{r} 745 \\ \underline{-441} \end{array}$ 20. $\begin{array}{r} 431 \\ \underline{-234} \end{array}$

Add or subtract:

21. $\begin{array}{r} 9 \\ \underline{+0} \end{array}$ 22. $\begin{array}{r} 7 \\ \underline{+4} \end{array}$ 23. $\begin{array}{r} 7 \\ \underline{-5} \end{array}$ 24. $\begin{array}{r} 41 \\ \underline{+18} \end{array}$ 25. $\begin{array}{r} 14 \\ \underline{-7} \end{array}$

26. $\begin{array}{r} 61 \\ \underline{+39} \end{array}$ 27. $\begin{array}{r} 54 \\ \underline{-23} \end{array}$ 28. $\begin{array}{r} 123 \\ \underline{+736} \end{array}$ 29. $\begin{array}{r} 64 \\ \underline{-46} \end{array}$ 30. $\begin{array}{r} 495 \\ \underline{+326} \end{array}$

31. $\begin{array}{r} 685 \\ \underline{-431} \end{array}$ 32. 5 + 2 + 3 = ______ 33. $\begin{array}{r} 570 \\ \underline{-248} \end{array}$ 34. $\begin{array}{r} 2161 \\ \underline{+1847} \end{array}$

Fill in the missing number:

35. 8 + ______ = 10   36. 81 − ______ = 63

Look at the pictures of the x's and fill in the blanks for the problem:

Example: x x
x
_3_ × _1_

37. xx xx
______ × ______

38. xxxx xxxx
______ × ______

Multiply:

39. 2 × 6 = ______

40. 4 × 3 = ______

41. 6 × 9 = ______

42. 5 × 8 = ______

43. 7 × 9 = ______

44. 8 × 8 = ______

45. 4 × 2 × 1 = ______

46. 4 × 3 × 2 = ______

47. $\begin{array}{r}10\\ \underline{\times 2}\end{array}$ 48. $\begin{array}{r}100\\ \underline{\times 9}\end{array}$ 49. $\begin{array}{r}50\\ \underline{\times 2}\end{array}$ 50. $\begin{array}{r}30\\ \underline{\times 3}\end{array}$

51. $\begin{array}{r}32\\ \underline{\times 6}\end{array}$ 52. $\begin{array}{r}24\\ \underline{\times 2}\end{array}$ 53. $\begin{array}{r}833\\ \underline{\times 3}\end{array}$ 54. $\begin{array}{r}472\\ \underline{\times 2}\end{array}$

Divide:

55. 8 ÷ 4 = ______

56. 12 ÷ 2 = ______

57. 48 ÷ 6 = ______

59. 0 ÷ 5 = ______

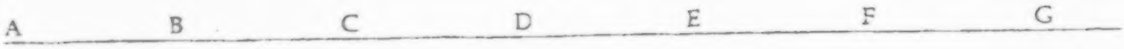
60. 0 ÷ 7 = ______

61. 56 ÷ 8 = ______

63. $13\overline{)52}$ 64. $25\overline{)50}$ 65. $5\overline{)43}$ 66. $6\overline{)51}$ 67. $68\overline{)93}$ 68. $18\overline{)57}$

Fill in the numbers:

69. 6 × ______ = 48 70. ______ ÷ 2 = 9



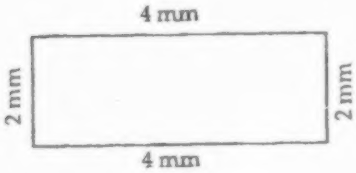
71. How long is the line from point A to G? ______ inches

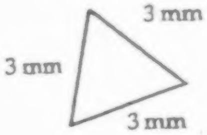
72. How long is the line from point A to F? ______ inches

Convert to inches:

73. 2 feet = ______ inches 74. 1 foot + 10 inches = ______ inches

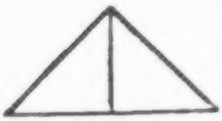
Find the perimeter:

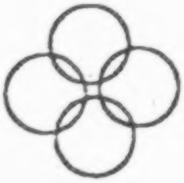




75. ______ millimeters 76. ______ millimeters

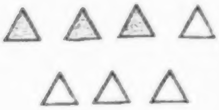
Count the number of shapes:

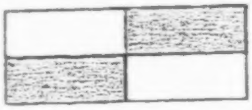




77. ______ 78. ______

Give a fraction to tell how much is shaded:





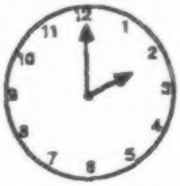
79. ______ 80. ______

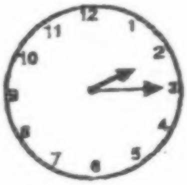
Use $ or ¢ to show the total value:

81. 2 dollars, 4 dimes, 6 pennies = ______

82. 5 dollars, 5 nickels, 5 pennies = ______

Write the time shown on each clock:





83. ______ 84. ______

Find each answer:

85. Peter weighed 150 lbs. He gained 19 lbs. How much does he weigh now? ______

86. Sharon read 151 pages and Jane read 89 pages. How many more pages did Sharon read? ______

87. 8 cookies on a tray. 4 trays in all. How many cookies in all? ______

88. Newspapers are 10¢ each. How many can you buy with 55¢? ______

MATH FOR NATIVE AMERICANS

1. IDENTIFY CAUSES OF PROBLEMS
2. BUILD STUDENT'S SELF CONFIDENCE
3. MOTIVATE STUDENTS: MAKE MATH INTERESTING AND FUN
4. BASE MATH ON STUDENT'S BACKGROUNDS AND COMMUNITY
5. KNOW AND USE THE NATIVE CULTURE AND VALUES
6. USE COOPERATIVE LEARNING
7. TEACH THE LANGUAGE OF MATH
8. USE NATIVE LEARNING STYLES
9. PROVIDE OPPORTUNITIES FOR SERVICE LEARNING
10. PROMOTE SELF ESTEEM AND INSPIRE HIGH ACHIEVEMENT
11. INVOLVE PARENTS AND RELATE TO COMMUNITY AND STUDENTS

Teaching Word Problem Solving at the Primary Level

Susan C. Howell Ruth S. Barnhart

Although helping student develop their ability to solve word problems is emphasized in elementary school mathematics programs, many students have difficulties solving problems of this type. Teaching children to think logically about work problems is the core of the professional responsibility of mathematics educators (Knifong & Burton, 1985). They need to be aware of how to guide their students in developing strategies to use in solving word problems.

This article describes a strategy unit to be used as supplement to the established mathematics curriculum. The unit follows a sequential pattern of learning that begins with the concrete level of thinking and continues through the representational level to the abstract level. It aids teachers in helping students see relationships, internalize concepts, and transfer learning so that they are able to solve word problems at the abstract level. Because it takes time to develop thought processes, ample practice must be provided with each new addition of a skill or idea.

Different mathematics concepts are taught at various learning levels. At the second and third-grade levels, the same procedures are used as at the first-grade level; however, larger numbers are used, and the problem types are more complex. In addition, at the third-grade level all four mathematical operations are options in solving word problems. It is important to be aware of students' current levels of performance so that learning materials can be matched appropriately to their levels of mathematical thinking.

Stage I: Concrete

Stage I – the concrete level of thinking is characterized by an inability to understand the meaning of symbols as representing something concrete (Copeland, 1974). At this stage the child is beginning to develop a system of though and therefore is tied to the concrete, achieving "conservation of attributes" (e.g., volume, time, area) singularly (Underhill, 1977). Generalization of conservation of attributes is difficult, therefore, each attribute is learned separately.

New mathematical concepts should be presented at the concrete stage, giving the student the opportunity to have hands-on-experiences with objects that he or she can manipulate. All students benefit from an active approach to learning, which helps them bridge the gap between their own concrete environment and the abstract level of mathematical thinking. The following six instructional steps are designed to guide students through the concrete level of thinking. The steps may be modified as needed to apply to the concept being taught.

Step 1. Free Exploration

Provide a time in which the children can freely explore manipulative devices such as blocks, button, beads. Let them build with, make patters from, count, and investigate the materials. This discovery time will allow the children to satisfy their curiosity so that they will focus their attention on the teacher's presentation when necessary.

Step 2 Purposeful Exploration

Purposeful exploration is exploration done for a specified reason with specific guidelines. For example, the student may be provided with a board that is divided into two sections and a specified number of objects (e.g., seven buttons). Have the students place some of the buttons on one side of the line on the board and the rest on the other side. Ask, "How many button do you have on each side?" A student who has three buttons on one side and four button on the other will say, "I have three buttons and four buttons."

Step 3 Number Cards

Number cards are individual cards numbered from 1 through 10. They are introduced to represent the groups of objects in the previous activity. After grouping the objects, the students select number cards to represent the number of objects in each group. The corresponding number cards are placed below the groups of objects. For example, the card with the numeral 3 is placed under the three buttons groups in Step 2 and the card with the numeral 4 is placed under the group of four buttons.

Following the placement of the number cards, introduce a plus (+) sign and explain that it means that the group of three buttons combined with the groups of four buttons becomes a group of seven buttons. Place the equals (=) sing to show that combining three buttons and four buttons is the same a making a groups of seven buttons. Have the students place number card 7 under the group of seven buttons.

Step 4 Number Sentence

In this step, the teacher gives number "sentences' and the students illustrate them using manipulative objects. For example, present the number sentence "2 buttons + 3 buttons = 5 buttons. The students are to place two buttons on one side of the board and three buttons on the other side. Combining the two groups makes a group of five buttons.

Step 5 Mathematical Word Problems

Word problems are read to the students. To solve a word problem, the students use manipulates to make a physical representation of it and then select symbolic cards to correspond to their model.

For example, present the following problem: "there are six red pegs in the box. There are also two yellow pegs in the box. How many pegs are in the box?" The students count six red pegs and place them on one side of the line on the board; then they count two yellow pegs and place them on the other side of the line. Selecting the proper number cards, 6 and 2, they place them under the right groups of pegs. Combining the two groups, they discover a total of eight pegs. The number card 8 is placed to represent "6 pegs + 2 pegs = 8 pegs."

Step 6 Verbal Explanation

As a final step in the concrete stage, the children describe verbally what they did to represent a problem and why. If this is done correctly, they are ready to move on to the next stage of learning.

For example, after reading the problem "There are three big squares and two little squares. How many squares are there?" to the children, have them place the correct number and sizes of squares on their boards. The children should verbalize, I put three big squares on one side and two little squares on the other side. When I put them together, there are five squares. To find out how many squares there are, I put the groups together so '3 squares + 2 squares = 5 squares.'"

Stage II: Representational

The representational stage of thinking is what Copeland (1974, p. 84) referred to as the "partial understanding" level. It is divided into two sub-stages : the semi-concrete level, which uses *pictorial* representation of problems, and the semi-abstract level, in which ideas ca be shown by graphic representations or tally marks. Instructional strategies here should draw on the images formed and the understanding attained at the earlier, more concrete stage. The Stage II level of activities links these images with symbolic representations in order to prepare the children to deal with word problems at the abstract level (Baratta-Lorton, 1976).

Step 1 Picture Representation Cards

In this step, manipulatives are replaced by pictures as aids in solving problems. Manipulatives that display two colors can be used along with laminated picture cards that display the same objects that the students have. In the following example, the children are instructed to play "detective" and try to discover who many combination they can make by using the same number of objects and dividing them according to color.

The students are given nine lima beans that have been spray-painted red on one side and white on the other (Math Their Way manipulatives). The children can come up with combinations that range from a set of nine white beans and zero red beans to the other extreme where the set consists of zero white beans and nine red beans. They record each new combination that is discovered by simply coloring the same number of beans on the card as there are actual red lima beans.

Step 2 Number Sentences

The students then write corresponding number sentences directly below the shaded pictures. (Provide ample space for written work). For example, three shaded red beans and six unshaded white beans would be represented by the number sentence + 6 = 9."

Step 3 Mathematical Word Problems

Story problems are presented next. Ask the children to represent the problem(s) by shading in the correct number of objects on the laminated cards and then write a corresponding number sentence.

For example, say, "You have five red beans and four white beans. How many beans do you have?" the children would shade the correct number of beans on their laminated cards. Below the shaded objects, they would write the number sentence "5 + 4 = 9."

Step 4 Graphic Representation

Manipulative objects used to solve the problems in this step are represented by using some form of graphics in recording. Each child is given a card that is divided into three columns. Each column is headed with the name of an object. Tally marks are placed in the appropriate column for every oObject that is to be recorded.

For example, write one of the following headings at the top of each column: "Red Beans," "White Beans," "Total." Ask the students to make a line or a tally mark in the appropriate column for each of the objects they have. For example, four red beans are represented by four lines (tally marks) in the column headed "Red Beans," three white beans are represented by three lines in the "White Beans" column, and seven tally marks are made in the "Total" column. Encourage the students to think about how the use of tally marks is similar to the pictorial representations.

Step 5 Number Sentences

Number sentences are written to correspond to the recorded tally marks. The example in the previous step would be written numerically as "4 + 3 = 7."

Step 6 Mathematical Word Problems

In this step, the students represent the story problem given by the teacher by placing groups of tally marks in the appropriate columns. The corresponding numerical sentence is printed beneath the semiabstract representation.

For example, tell the students, "I have seven red beans and two white beans. How many beans do I have?" To solve the story problem, the children will place seven marks in the "Red Beans" column and two marks in the "White Beans" column. In the "Total" column, nine tally marks should be made. The number sentence will be written "7 + 2 = 9."

The students can then construct their own word problems and discuss their approaches to solving them. By asking and answering questions, the students continue on to bridge the gap between the representational and abstract levels of thinking. They should then be ready to move on to the final stage, the abstract level.

Stage III: Abstract

The full or complete understanding level is referred to as the *abstract stage* (Copeland, 1974, in which students solve story problems by using visual imagery and recalling their previous concrete and representations experiences. They use written mathematical number sentences to represent their thoughts. A major goal of mathematics instruction is to help children learn to operate efficiently at the abstract level with an understanding of the concepts or skills in question (Hynes, 1986). This is the level at which mastery occurs. The following steps provide experiences to ehlp students internalize the process of solving problems.

Step 1 Thinking Strategy

Present the following five-point checklist as at thinking strategy (Eicholz et all, 1985) to solve word problems. Students should go through this process to learn to become independent problem solvers.

1.	Question	(Understand the question).
2.	Data	(Find the needed data).
3.	Plan	(Plan what to do).
4.	Answer	(Find the answer).
5.	Check	(Check the answer).

For example, say, "Jim has five red balls and three green balls. How many balls does Jim have?" Go through each point in the checklist and have the students respond.

1.	Question.	What is the question in the problem? "How many balls does Jim have?"
2.	Data	What numbers are in the problem? "Five red balls and three green balls, 5 and 3."
3.	Plan	What are you going to do? "Combine red balls and green balls, or put together the two groups of balls."
4.	Answer	What is the answer when you combine the two groups? "5 + 3 = 8."
5.	Check.	To check the answer, make tally marks to represent the balls. Count the tally marks.

Step 2 Story Problem Writing

Present numerical sentences for which the students are to write story problems. Again, discuss words that lave special meanings. Words that tell what operation(s) to use to solve the problem should also be indentified and discussed.

For example, the number sentence "5 – 2 = 3" may be written as the following story problem: "There are five kittens. Two kittens are white abd rest are black. How many kittens are black?"

Maintaining Skills

When students can solve story problems and verbally describe their problem-solving strategies, a the teacher can feel comfortable that they know what steps to use to solve story problems and have internalized the process. All along, it is important to check for maintenance of the acquired concepts and skills at all levels. One way to motivate children to practice and maintain acquired skills and concepts is through the use of games. When disguised as a game, practice of computational skills is just as effective as and much more palatable than drill and practice techniques (Ashblock & Herman, 1970).

Conclusion

Primary-level students need to be taught how to think for themselves, how to approach mathematical word problems and how to evaluate their solutions. As they are guided through concrete, representational, and abstract levels of thinking, they will begin to internalize their thoughts and strategies. The goal of developing competent word problem solvers is important because it prepares children to function in the real world.

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